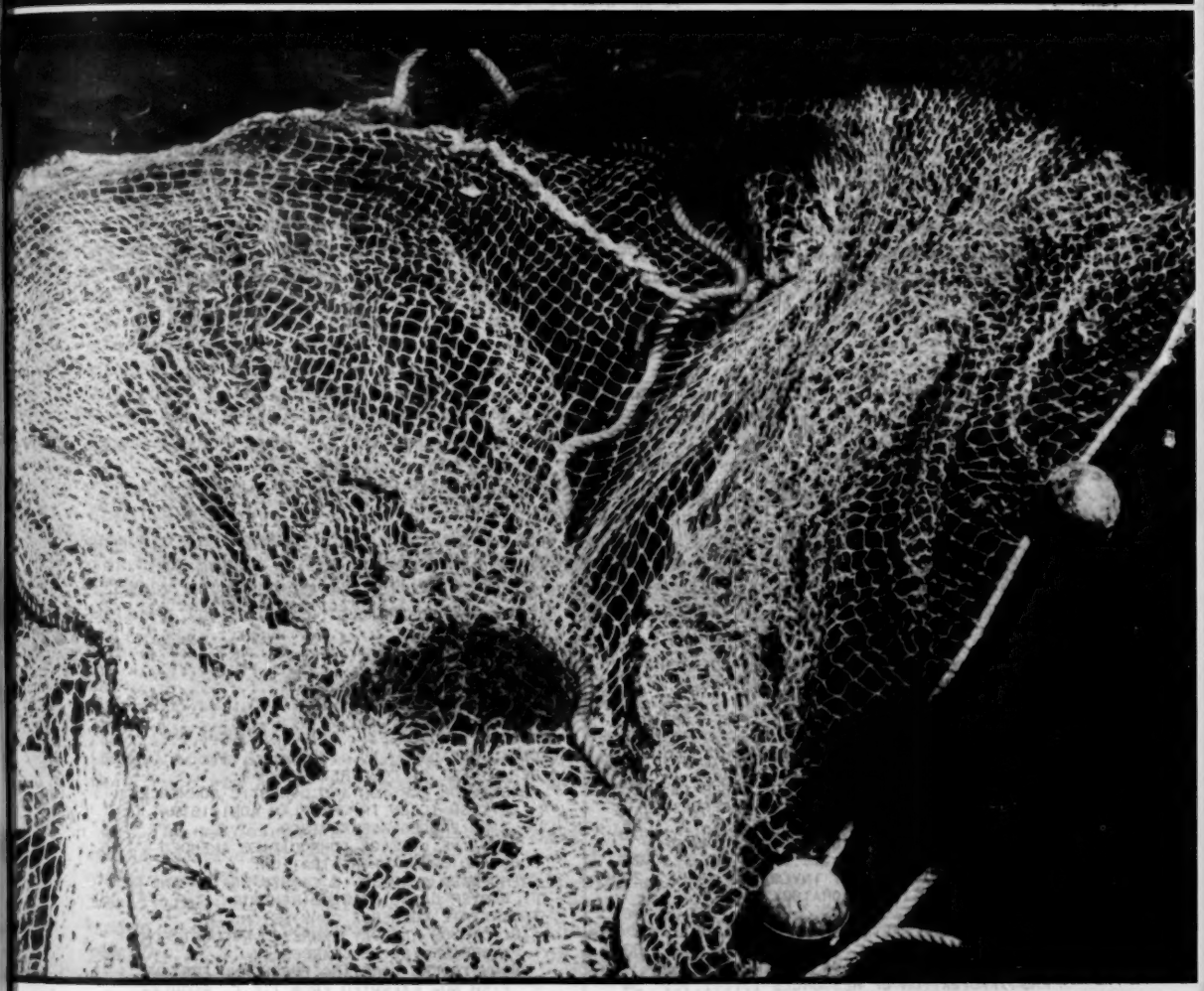
UM LIBRARY
DEC 19 '49
UNIV. OF MICH.

COMMERCIAL FISHERIES REVIEW



VOL. 11, No11 NOVEMBER 1949

FISH and WILDLIFE SERVICE
United States Department of the Interior
Washington, D.C.

UNITED STATES
DEPARTMENT OF THE INTERIOR
J.A.KRUG, Secretary

FISH AND WILDLIFE SERVICE
ALBERT M. DAY, Director

COMMERCIAL FISHERIES REVIEW

A REVIEW OF DEVELOPMENTS AND NEWS OF THE FISHERY INDUSTRIES
PREPARED IN THE BRANCH OF COMMERCIAL FISHERIES

A. W. Anderson, Editor
R. T. Whiteleather, Associate Editor
Wm. H. Dumont and J. Pileggi, Assistant Editors

Applications for COMMERCIAL FISHERIES REVIEW, which is mailed free to members of the fishery industries and allied interests, should be addressed to the Director, Fish and Wildlife Service, United States Department of the Interior, Washington, 25, D.C.

The contents of this publication have not been copyrighted and may be reprinted freely; however, reference to the source will be appreciated. The Service assumes no responsibility for the accuracy of material from outside sources.

CONTENTS

COVER: OTTER TRAWL NET ON THE SURFACE. CREW OF NEW ENGLAND TRAWLER HAS JUST PUT THE NET OVERBOARD PRIOR TO RELEASING THE OTTER BOARDS.

PAGE

PH DATA ON PACIFIC OYSTERS, BY R. B. ANDERSON, C. W. BETZOLD, AND W. J. CARR 1
THE MUSSEL RESOURCES OF THE NORTH ATLANTIC REGION - PART III - DEVELOPMENT OF THE FISHERY AND THE POSSIBLE NEED FOR CONSERVATION MEASURES, BY L. W. SCATTERGOOD AND C. C. TAYLOR 3

* * * * * *

PAGE

RESEARCH IN SERVICE LABORATORIES: 14
FISHERIES TECHNOLOGICAL RESEARCH PROGRAM, 1949-50 15
TRENDS AND DEVELOPMENTS: 21
ADDITIONS TO THE FLEET OF U. S. FISHING VESSELS 21
ATOM ENERGY TO AID SHELLFISHERY RESEARCH 21
DRAFT AGREEMENT ACCEPTED FOR GENERAL MEDITERRANEAN FISHERIES COUNCIL 22
ECA PROCUREMENT AUTHORIZATIONS FOR FISHERY PRODUCTS 23
FEDERAL PURCHASES OF FISHERY PRODUCTS .. 24
FISHERY BIOLOGY NOTES 24
FISHERY OUTLOOK FOR OCTOBER-DECEMBER ... 26
FRESH AND FROZEN FISH REPORT IN RESPONSE TO H. RES. NO. 174 (81ST CONGRESS) 26
F.A.O. PROPOSES AN INTERNATIONAL COMMODITY CLEARING HOUSE 28
PACIFIC OCEANIC FISHERY INVESTIGATIONS . 29
NORTHWEST PACIFIC EXPLORATORY FISHERY PROGRAM 30
PROPOSED SPLIT HALIBUT-FISHING SEASON .. 31
SCHOOL LUNCH PROGRAM, 1949-50 33
SCIENTIFIC CONFERENCE ON CONSERVATION AND UTILIZATION OF RESOURCES 34
SEA LAMPREYS CONTINUE TO INCREASE IN GREAT LAKES 37
SEALSKIN PRICES DECLINE AT FALL FUR AUCTION 39
WHOLESALE AND RETAIL PRICES 39
FOREIGN: 41
AUSTRALIA 41
BIZONE GERMANY 41
CANADA 42
COSTA RICA 43
CUBA 43
DENMARK 44
GREENLAND 45
GUATEMALA 46
ICELAND 46

PAGE

FOREIGN (CONTD.):
JAPAN 48
MEXICO 52
COLONY OF MOZAMBIQUE 52
NORWAY 53
PAKISTAN 57
PORTUGAL 57
RYUKYU ISLANDS 58
SPAIN 58
SWEDEN 62
UNITED KINGDOM 64
FEDERAL ACTIONS: 68
DEPARTMENT OF COMMERCE:
BUREAU OF FOREIGN AND DOMESTIC COMMERCE:
BRITISH TOKEN IMPORT PLAN ADMINISTRATION PROCEDURES REVISED 68
POSITIVE LIST OF COMMODITIES AMENDED . 68
FOOD AND DRUG ADMINISTRATION:
PROPOSED CHANGES IN CANNED SHRIMP AND OYSTER LABELING REQUIREMENTS 69
INTERSTATE COMMERCE COMMISSION:
REPORT ON RAILWAY EXPRESS' REQUEST FOR INCREASE IN ICE CHARGES 69
MANY TRUCKS CARRYING FRESH AND FROZEN FISH NOW EXEMPTED FROM I.C.C. REGULATIONS 70
DEPARTMENT OF STATE:
RATIFICATION OF INTERNATIONAL FISHERY AGREEMENTS 71
EIGHTY-FIRST CONGRESS (FIRST SESSION) SEPTEMBER 1949 72
GRAPHS: 74
LANDINGS AND RECEIPTS 74
COLD STORAGE HOLDINGS AND FREEZINGS OF FISHERY PRODUCTS 75
CANNED FISHERY PRODUCTS 76
PRICES, IMPORTS AND BYPRODUCTS 77
RECENT FISHERY PUBLICATIONS: 78
FISH AND WILDLIFE SERVICE PUBLICATIONS . 78
MISCELLANEOUS PUBLICATIONS 79

COMMERCIAL FISHERIES REVIEW

November 1949 Washington 25, D.C. Vol.11, No.11

pH DATA ON PACIFIC OYSTERS

By R. B. Anderson,* C. W. Betzold,** and W. J. Carr*

INTRODUCTION

Methods for determining the relative freshness of shucked Eastern oysters were investigated by Baldwin, Puncochar, and Pottinger (1941). The pH measurement from the standpoint of rapidity and reliability was deemed the most satisfactory. Hunter and Linden (1923) observed a relationship existing between pH of the oyster liquor and the appearance and odor of the oysters. Measurements of pH can be of value in examining shucked oysters of doubtful quality according to investigations of Hunter and Harrison (1928). Pottinger (1948) found that pH values were a useful index in following changes in the degree of freshness of shucked Eastern oysters. As the result of Piskur's work (1947), it may be concluded that pH measurements may possibly be of value as an objective index of quality of shucked Pacific oysters. In reviewing these investigations, it is noted that Piskur (1947) made his pH evaluations on ground oysters, while Pottinger (1948) made his on the oyster liquor.

In studies being made with shucked Pacific oysters in the Sixth Army Area Food Laboratory, U. S. Department of the Army, pH values were obtained on ground oysters and oyster liquor from the same samples. These findings are the basis for this report. The oysters examined had all been physically and organoleptically accepted as satisfactory at the shucking plants by qualified army veterinary inspectors. Army acceptance of good quality requires a pH value of 6.20 at origin.

PROCEDURE

The samples used in this study were those submitted for examination as to pH and score under the regular method of drawing Army samples. Some samples were received in a frozen state, some were not.

The pH determinations were made on a Beckman pH meter, laboratory model G, using glass electrodes properly adjusted to the instrument, as well as for temperature. The sample jars, usually half-pint mason-type jars, which were ordinarily one-half to three-quarters full, were inverted gently several times in order to obtain comparable amounts of the oyster liquor present. Three 5-ml. samples of the liquor were withdrawn for pH determinations. The remainder of the sample was transferred to a Waring Blender and blended for 30 to 60 seconds or until a paste-like consistency was obtained. Enough of this material to fill three 5-ml. beakers was withdrawn, as representative of the whole, for the purpose of making the pH valuations. The average of the three readings on liquor and blended oysters was taken as the pH for the sample.

* Chemist, Sixth Army Area Food Laboratory.

** Lt. Col., V. C., U.S.A.

NOTE: This article was submitted for publication by the authors who are connected with the Sixth Army Area Food Laboratory, U. S. Department of the Army, Seattle, Wash., with the approval of their agency.

Table 1 - Average pH of Samples Received Frozen[1]

No. of Samples[2]	Oyster Liquor[3]	Blended Sample[3]	Difference
6	6.65	6.10	0.55
4	6.62	6.15	0.47
5	6.55	6.10	0.45
7	6.50	6.10	0.40
3	6.35	6.25	0.10
3	6.32	6.05	0.27
3	6.30	6.10	0.20
4	6.25	6.10	0.15
7	6.20	6.10	0.10
5	6.10	6.00	0.10
2	6.00	5.90	0.10

1/All samples were thawed at room temperature.
2/Number of original samples received for examination.
3/Average of three determinations.

Table 2 - Average pH of Samples Received Fresh Chilled

No. of Samples[1]	Oyster Liquor[2]	Blended Sample[2]	Difference
3	6.42	6.20	0.22
4	6.40	6.30	0.10
15	6.35	6.25	0.10
18	6.30	6.06	0.24
18	6.25	6.06	0.19
55	6.20	6.05	0.15
3	6.15	6.15	0.00
8	6.10	6.10	0.00
40	6.05	5.97	0.08
18	6.00	5.96	0.04
4	5.95	5.95	0.00
4	5.90	5.85	0.05

1/Number of original samples received for examination.
2/Average of three determinations.

pH valuations were made on 239 samples. Of these, 49 were received in a frozen state and 190 were received fresh chilled. The results are shown in Tables 1 and 2.

DISCUSSION

It was found that the initial pH of the liquor was somewhat higher than that of the blended meats. The two values became more nearly equal the closer the pH approached 6.00. The difference in pH between liquor and blended meats was greater in the case of frozen samples.

These data were obtained from relatively few samples and are meant to be used to show the relationship existing between the pH of the liquor and blended meats on the same oyster sample. Future work on this subject should be designed to show the relationship existing between pH of oyster liquor and ground meats, and the scores obtained from a qualified taste panel. This would give a better indication of sample quality condition and be an important basis for selecting which sampling method should be used in determining pH values for oyster quality.

LITERATURE CITED

BALDWIN, W. H., PUNCOCHAR, J. F., and POTTINGER, S. R.

1941. Some preliminary studies on the relative value of methods for indicating quality of shucked oysters. U. S. Fish and Wildlife Service, Bulletin F.I. 2468-k.

HUNTER, A. C. and HARRISON, C. W.

1928. Bacteriology and chemistry of oysters with special reference to regulatory control of production, handling and shipment. U. S. Department of Agriculture, Tech. Bull. No. 64.

----- and LINDEN, B. A.

1923. An investigation of oyster spoilage. American Food Journal 18, No. 11: pp. 538-540.

PISKUR, F. T.

1947. Preliminary study of correlation of pH and quality of shucked Pacific oysters. Commercial Fisheries Review, vol. 9, no. 6, pp. 22-24.

POTTINGER, S. R.

1948. Some data on pH and freshness of shucked Eastern oysters. Commercial Fisheries Review, vol. 10, no. 9, pp. 1-3.

THE MUSSEL RESOURCES OF THE NORTH ATLANTIC REGION

PART III - DEVELOPMENT OF THE FISHERY AND THE POSSIBLE NEED FOR CONSERVATION MEASURES

By Leslie W. Scattergood* and Clyde C. Taylor**

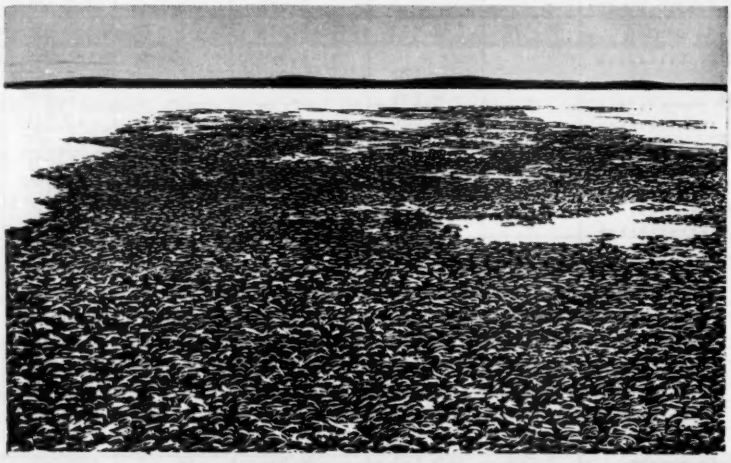
* Fishery Biologist
** Formerly Biological Aid
Branch of Fishery Biology, U. S. Fish and Wildlife Service

INTRODUCTION

This is the third and concluding paper concerning the North Atlantic mussel fishery. The two previous papers have discussed the efforts to determine the possible magnitude of a mussel fishery and then to assist in the development of the fishery. This article presents the history of the recent fishery and the role of conservation.

DEVELOPMENT OF THE FISHERY

The year 1942 marked the beginning of the mussel canning industry in New England. A small pack of pickled mussels was processed in May 1942 by a Maine cannery. In the summer of 1942, another Maine cannery packed a few cases of mussels as an experiment. At the same time, the Fish and Wildlife Service similarly was preparing some trial packs. In October and November, the mussel



A BED OF SEA MUSSELS, MARTHAS VINEYARD, MASS.

NOTE: Part I (The Survey to Discover the Locations and Areas of the North Atlantic Mussel Producing Beds) of this series appeared in the September 1949 issue of Commercial Fisheries Review, pp. 1-10. Part II (Observations on the Biology and the Methods of Collecting and Processing the Mussel) of this series appeared in the October 1949 issue, pp. 8-20.

canning was still on an experimental basis. During December 1942, one cannery processed a total of 400 bushels, and an increasing number of cannery operators became interested in the potentialities of the mussel industry. In January 1943, representatives of the Fish and Wildlife Service held a meeting in Boothbay Harbor, Maine, to discuss the prospective mussel fishery as revealed by the survey.

Table 9 - Yield of Maine Mussel Fishery, By Counties, By Months[1/]

Month	COUNTIES					Value
	Knox	Hancock	Washington	Other	Total	
	Bushels	Bushels	Bushels	Bushels	Bushels	Dollars
May 1942	-	-	2/1,500	-	1,500	750
Total 1941-42 season	-	-	2/1,500	-	1,500	750
December 1942	-	-	400	-	400	160
January 1943	-	-	817	-	817	327
February 1943	1,264	2,205	1,198	-	4,667	4,667
March 1943	11,804	780	6,006	-	18,590	14,872
April 1943	5,157	30,177	807	-	36,141	28,913
May 1943	1,743	26,725	7,651	-	36,119	28,895
June 1943	-	3,724	7,237	-	10,961	8,769
Total 1942-43 season	19,968	63,611	24,116	-	107,695	86,603
November 1943	151	1,794	476	-	2,421	1,695
December 1943	4,630	15,243	2,641	-	22,514	9,006
January 1944	3,114	13,924	2,461	-	19,499	7,800
February 1944	5,184	13,569	3,383	-	22,136	8,854
March 1944	9,457	25,841	3,941	-	39,239	15,695
April 1944	12,682	37,858	1,693	3/1,497	53,730	21,492
May 1944	314	23,213	3,081	-	26,608	13,304
June 1944	-	-	1,681	-	1,681	504
Total 1943-44 season	35,532	131,442	19,357	1,497	187,828	78,350
October 1944	-	-	1,327	-	1,327	398
November 1944	-	4,189	1,377	-	5,566	1,948
December 1944	-	6,123	-	-	6,123	2,143
January 1945	-	12,041	-	-	12,041	4,817
February 1945	832	11,361	1,170	-	13,363	4,009
March 1945	1,343	15,553	4,195	-	21,091	6,327
April 1945	1,465	32,496	3,459	-	37,420	13,097
May 1945	469	27,396	5,463	-	33,328	13,331
June 1945	-	8,016	2,747	-	10,763	3,767
Total 1944-45 season	4,109	117,175	19,738	-	141,022	49,837
September 1945	-	-	1,082	-	1,082	325
October 1945	592	8,058	6,483	-	15,133	6,053
November 1945	1,269	16,711	5,288	-	23,268	9,307
December 1945	2,392	16,848	4,985	-	24,225	9,690
January 1946	1,648	14,246	4,720	-	20,614	8,246
February 1946	535	7,631	2,100	-	10,266	4,106
March 1946	548	30,945	3,083	4/ 4	34,580	13,832
April 1946	71	53,548	-	-	53,619	21,448
May 1946	-	14,343	568	-	14,911	5,964
Total 1945-46 season	7,055	162,330	28,309	4	197,698	78,971
October 1946	-	1,332	842	-	2,174	734
November 1946	-	-	890	-	890	267
December 1946	-	-	10,496	-	10,496	4,010
January 1947	-	546	-	-	546	218
Total 1946-47 season	-	1,878	12,228	-	14,106	5,229

1/From statistical reports of the Maine Department of Sea and Shore Fisheries.
2/This quantity credited to Hancock County through error.
3/Lincoln County.
4/York County.

Cannery operators and representatives of the Massachusetts Division of Marine Fisheries, the Maine Department of Sea and Shore Fisheries, the U. S. Pure Food and Drug Administration, and the Fish and Wildlife Service attended. The meeting provided the necessary facts for utilizing mussels, and shortly thereafter, with the seasonal increase in yield of meats per bushel, the onset of favorable fishing weather, and the presence of a promising market, there was a considerable expansion of the fishery.

Table 9 shows the yield of the Maine mussel fishery for six seasons. Similar information is not available for Massachusetts, but it is known that several thousands of bushels were packed in that State during both the 1943 and 1944 seasons. The Massachusetts mussels were obtained from Cape Cod and Buzzards Bays, while those in Maine were predominantly from the Hancock County region which includes the areas of Frenchman, East Penobscot, and Blue Hill Bays.

From Table 9, it is apparent that the three-month period, March to May, represented the peak of production in five of the six seasons. The primary reason for this seasonal peak was that the mussel meats were well developed during this period, and thus the cost of the raw material was lower. There are several reasons why the April pack was higher than that of May, when the meats were even heavier. Perhaps, the most important reason was that the canned mussel market was generally uncertain and canners were reluctant to have too great a pack of unsold mussels. During the spring months, the production greatly exceeds the immediate demand. In late May, some canners stop packing mussels because they are approaching the spawning period. As the gonads near their maximum development, the enlarged mantle is torn easily during the shucking or washing operation, and the meats have a poor appearance in the can. Still other canneries begin in May to process or make preparations for canning fish, and therefore, cease mussel packing.

The 1946-47 season shows a marked decrease in the mussel fishery. The primary reason for this abrupt decline from the previous season's production is that there was a carry-over of some of the 1945-46 pack and the canners were reluctant to pack any quantities until the extent of the postwar demand could be determined. Consequently, no mussels were processed during the 1947 spring season.

At the present time, a small but fairly steady demand for canned mussels has been established, but this was not always so. When the first large quantities of mussels were processed in 1943, the product was almost unknown to the American public. However, due to the shortage of other types of canned shellfish, wholesalers and retailers did not hesitate to purchase the pack. In 1944, there were reports that consumers were not buying the mussels, and that retailers were overstocked. The future of the fishery appeared to be uncertain, since brokers were becoming reluctant to handle the product.

Several meetings to discuss this problem were held by the mussel canners, the Maine Development Commission, the Department of Sea and Shore Fisheries, and the Department of Agriculture, and the United States Fish and Wildlife Service. Several important facts were revealed. First, some of the canned mussels were of inferior quality because of careless handling, and these inferior packs tended to discourage the future sales of mussels. Second, certain regions had developed into good markets for this shellfish, despite a lack of concerted advertising. While there was a recognized need for advertising, the canners were somewhat reluctant to finance a well-organized campaign. It was apparent that advertising would not be efficacious unless the entire mussel pack was of prime quality. The

establishment of standards for canned mussels was discussed, but no definite commitments were made by the packers.

Subsequently, some of the canners set up and maintained certain standards of quality, and carried on local advertising and demonstrations in various cities. These more energetic packers can be given the credit for increasing the sales of mussels after 1944. Lowered prices, improved quality, and a seafood of distinct merit were responsible for their success.

CONSERVATION

The production of mussels probably will be limited in the future by the available supply. In many regions, especially those in which the mussel beds were located in shallow water, it has not been difficult to deplete seriously the local supply of marketable mussels within a fishing season or less, especially when all sizes of mussels have been removed. Where the growth rate is slow, these depleted mussel beds may be rendered practically worthless for several years, until seed mussels have a chance to set and grow to marketable size. The stripping of mussels from the shallow water beds is relatively simple, for mussels, unlike clams, lie exposed on the flats. When it is apparent that the mussel population is being depleted, the possibility of applying conservation methods must be considered.

Regulation of the mussel fishery should be based on the need for utilizing the mussel resources to greatest advantage in order to maintain a sustained high yield. Obviously, mussel regulations would not be necessary because of any possible extinction of the mussel, for the fishery would be unprofitable long before extinction. Unfortunately, there are a great many factors affecting mussel population about which little is known. An optimum conservation policy cannot be formulated until an intensive study of the North Atlantic mussel beds is carried on to determine the relationship between natural and fishing mortalities; the growth and survival rates under various conditions, such as occur at various levels of the tidal range or on beds of different population densities; factors influencing spawning, larval drift, and the resultant setting of spat; and the practicability of transplantation to build up a depleted mussel area.

While there is not yet a clear understanding of all the factors influencing the establishment and growth of mussel beds, there are two measures which can be taken to assure that the present mussel resources are utilized to the best advantage. These regulations are:

(1) A closed season when mussel meats are thin.

(2) A minimum size law to eliminate destruction of young mussels.

It is understood, of course, that these two measures will not wholly prevent further depletion but they will, however, eliminate an obviously unwise utilization of the shellfish. Similar regulations are in effect for the soft-clam fishery.

A closed season when no harvesting could be done would prevent the use of mussels whose yield of meats is at a seasonal low. From the data accumulated at Friendship and Boothbay Harbor, Maine, it is evident that in the period July through March, mussels are relatively thin. For example, as shown in Table 6,1/ a bushel of Friendship mussels collected in the first week of December yielded 5.87 pounds of steamed meats. In the first week of April, a bushel yields 8.55

1/See Part II of this article which appeared in the October 1949 issue of Commercial Fisheries Review, p. 13.

pounds, an increase of over 45 percent; while in the first week of May, a yield of 9.36 pounds would be obtained, an increase of over 59 percent. At Boothbay Harbor, a bushel yields, during the period July 8 to February 22, between 11.0 and 13.5 pounds of raw meats. In April, weight of the raw meats would have increased between 14 and 40 percent; in May, from 30 to 59 percent; and in June, from 43 to 76 percent. Thus, the practice of harvesting mussels in months other than April, May, and June is a wasteful one.

During the war years, every effort was made to encourage the canneries to process mussels. A closed time was not urged because a maximum production of sea food was needed and the canneries were best able to process this species during December to May, without interference with other canning activities. In 1942-45, due to both the need for protein food and the definite uncertainty of the future of this new product in postwar years, it was felt that a maximum utilization of mussels was justified even if it was necessary to use them when poorly meated. Figure 6 shows that a considerable portion of the catch of the three greatest seasons was taken before the mussels reached their prime condition.

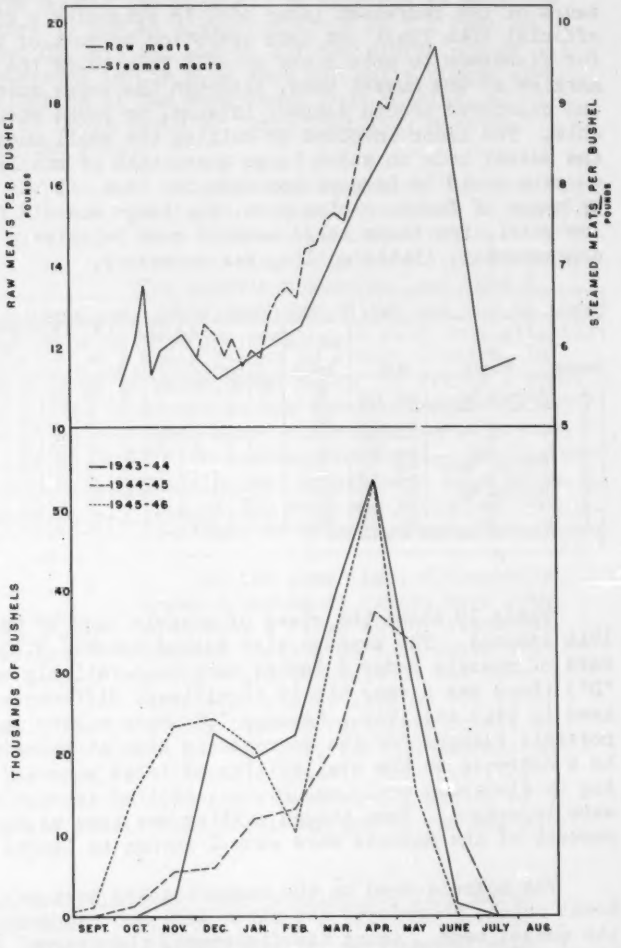


FIGURE 6 - THE SEASONAL YIELD OF RAW MUSSEL MEATS AT BOOTHBAY HARBOR, MAINE, AND OF STEAMED MUSSEL MEATS AT FRIENDSHIP, MAINE, AS COMPARED WITH THE SEASONAL PRODUCTION OF THE MUSSEL FISHERY FOR THREE SEASONS.

Because the mussel fishery in eastern Maine has developed to the stage in which actual local depletion of marketable mussels exists, it is advisable to propose a minimum size law which will protect the smaller mussels from destruction. It may be possible that after extensive study, a proposed 2-inch minimum size will be found too small, or perhaps even too large, to obtain the greatest continuous yield from a given mussel area. However, at the present time, some protection must be given to the mussels, or the yield from the mussel beds undoubtedly will decline further.

The Maine canneries insisted at the beginning of the 1943 fishery that the fishermen bring in no small mussels; the majority of all mussels purchased would have to measure between 2½ and 3 inches long. Small mussels were not desired because of the increased labor cost in obtaining a given volume of meats. This unofficial size limit put into operation by most of the canneries made it necessary for fishermen to obtain the mussels from below the low-tide mark, usually on the margins of the mussel beds, although the large mussels also were found submerged and clustered around ledges, islands, or rocks where growing conditions were favorable. The labor involved in culling the small mussels precluded the utilization of the mussel beds on which large quantities of smaller mussels existed. Although the mussels could be hand-picked from the beds, it was much more profitable to collect, by means of forks or clam hoes, the large mussels from two or three feet below mean low water, for those large mussels were relatively free of the smaller sizes and, consequently, little culling was necessary.

Table 10 - Size of Mussels Utilized by Maine Canneries in 1943 and 1944 Seasons

Cannery	Source of Mussels	Date	Quantity in Sample	LENGTH IN INCHES												Average length[1]		Percent below 2 inches	
				1.00 to 1.24	1.25 to 1.49	1.50 to 1.74	1.75 to 1.99	2.00 to 2.24	2.25 to 2.49	2.50 to 2.74	2.75 to 2.99	3.00 to 3.24	3.25 to 3.49	3.50 to 3.74	3.75 to 3.99	4.00 to 4.24	1943	1944	1943	1944
			No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	Inches	Inches	%	%
A	Muscongus Bay	Jan. 1943	86	1	1	-	-	2	17	42	23	5	-	-	-	-	2.63	-	2.3	-
B	Mt. Desert Region	June 1943	65	-	3	5	1	2	5	10	24	5	4	6	-	-	2.72	-	13.8	-
B	do	Apr. 1944	485	-	-	5	14	52	79	118	107	85	18	5	2	-	-	2.69	-	3.9
C	do	June 1943	127	-	2	-	-	5	4	15	28	32	26	10	4	1	3.04	-	1.6	-
C	do	Apr. 1944	622	-	-	10	36	70	101	124	137	84	51	8	1	-	-	2.67	-	7.4
D	Deer Isle Region	June 1943	98	-	1	-	-	2	3	11	16	39	12	9	5	-	3.08	-	1.0	-
D	do	Sept.1944	332	-	-	2	3	13	40	75	95	63	32	8	1	-	-	2.83	-	1.5
E	Muscongus Bay	Apr. 1943	475	-	-	-	-	3	33	77	132	123	74	25	6	2	2.99	-	.0	-
E	do	Apr. 1944	589	-	1	-	2	3	48	109	207	138	64	14	3	-	-	2.91	-	.5
F	do	May 1943	460	-	-	-	-	2	20	103	174	125	27	9	-	-	2.91	-	.0	-

1/Calculated from ungrouped measurements.

Table 10 shows the sizes of mussels used by Maine canneries in the 1943 and 1944 seasons. The average size ranged between 2.63 and 3.08 inches and the numbers of mussels under 2 inches were comparatively small. At two canners ("C" and "D") there was a very highly significant difference between the sizes of mussels used in 1943 and 1944. Cannery "B" shows a less marked decrease. There are two possible reasons for the decrease in size at these canneries. First, there could be a decrease in the availability of large mussels; and second, less strict culling by fishermen would result in a smaller average size. Probably both factors were important. Even though culling was less vigorous in 1944, 93 percent to 100 percent of the mussels were over 2 inches in length.

The mussels used by the canneries had been culled by the fisherman from his total catch; therefore, the sizes were not representative of the total drain on the mussel beds. Among the fishermen, the general practice has been to harvest the mussels and load the boats or scows during low tide. After the tide has risen over the beds, the mussels were taken ashore where the culling operation was performed, often under shelter. Those mussels which were undersized were not returned to the beds but were left on the shore where they soon died of exposure. The great mortality among these small mussels exposed to unfavorable conditions on the shore or upper part of the intertidal zone has been responsible for a common belief among fishermen that culling kills the small mussels.

An experiment was designed at Boothbay Harbor, Maine, to measure the effect of returning or transplanting small mussels to beds exhausted by commercial exploitation. Although transplantation is vigorously practiced wherever mussel culture is carried on in Europe, a practical demonstration of the value of returning small mussels to the beds was needed.

The area selected for this experiment was a small mussel bed near the Fisheries Station at Boothbay Harbor, Maine. This bed is in a cove sheltered from storms and relatively free from ice during the winter. In relation to mean low water, the experimental area (Figure 7) has an elevation of .6 to 1.1 feet on A_3, B_3, and C_3 plots, while A_2, B_2, C_2, A_1, B_1, and C_1 all had elevations of 1.1 feet. The only natural enemies observed in the area were sea gulls (Larus argentatus) and crows. At the termination of the experiment four mussles, all dead, showed perforations similar to those bored by Thais lapillus; however, this gastropod was not abundant in the area.

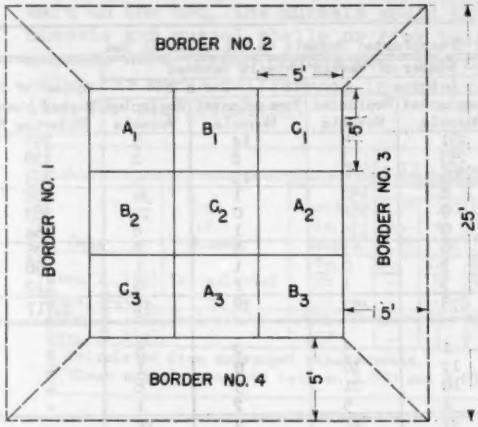


FIGURE 7 - DIAGRAM OF THE EXPERIMENTAL MUSSEL BED AT BOOTHBAY HARBOR, MAINE. MUSSELS WERE TRANSPLANTED TO A_1, A_2, AND A_3 PLOTS, REPLANTED ON B_1, B_2, AND B_3 PLOTS, WHILE C_1, C_2, AND C_3 PLOTS WERE LEFT BARE.

A 15-foot square of this bed was stripped of mussels on June 17, 1943, in a manner similar to that by which bed mussels are gathered commercially. The mussels measuring less than 2 inches were sorted out and 900 of these mussels, ranging in size from slightly under 1 inch to almost 2 inches in length, were marked by filing a short groove on one valve close to the umbo. Great care was exercised to prevent filing through the shell. The marked mussels were apportioned into three lots of 300 each and replanted June 21, 1943, on the B squares (Fig. 7).

At the same time, 876 mussels under 2 inches in length were gathered from a float at the Fisheries Station, marked on each valve with a filed groove close to the umbo, apportioned in 3 lots of 292 each, and transplanted to the A squares. The remaining squares were left devoid of mussels to serve as controls. The experiment was designed for 300 mussels on each of the A and B plots, but the supply of suitable mussels from the float was insufficient. The effect of the small difference between the number of planted mussels on the A and B plots should have little effect on the analysis of the experimental results.

As the transplanted mussels had relatively thin shells, the file marks had to be long and shallow or the shells would have been filed through completely. The replanted mussels, which had thicker shells, were marked with a short, much deeper groove. Thus, no problem of identification was presented when only one marked valve was later recovered. To determine the mortality resulting from marking, 40 mussels were marked in equal lots with one and two grooves and held for two weeks in one of the station's aquaria. No mortality was observed.

On December 21, 1943, the mussels were removed from the experimental area. The results are shown in Table 11. Since it was discovered that some marked mussels had shifted from one square to another during the course of the experiment, the area immediately surrounding the bed was examined on April 8, 1944, at which time, all mussels were removed from a 5 foot border around the experimental area. The numbers of marked mussels found within this area are also shown in Table 11.

As will be noted from Figure 7, the design of this experiment is that of a Latin Square, which tends to equalize the effect of conditions prevailing over the area and provides a standard method of analyzing the results.

An analysis of variance of the survival data in Table 11 indicates that no significant difference is apparent among the numbers of unmarked mussels entering the rows, columns, or types of plots. The center plot C_2 has the lowest number of unmarked mussels, as could be anticipated, due to that plot's being the farthest from any source of unmarked mussels. It must be remembered

Table 11 - Survival of Replanted and Transplanted Mussels on Experimental Bed

Plots	Date Planted	Number of Marked Mussels Planted	Date of Removal	Number of Marked Mussels Removed				Number of Unmarked Mussels Entering Bed
				Live		Dead		
				Transplanted Mussels	Replanted Mussels	Transplanted Mussels	Replanted Mussels	
A1	June 21,1944	292	Dec. 21,1944	231	9	14	9	357
A2	do	292	do	233	3	8	2	328
A3	do	292	do	206	1	12	0	363
B1	do	300	do	2	150	1	26	408
B2	do	300	do	0	151	0	22	282
B3	do	300	do	0	135	1	8	164
C1	-	-	do	0	7	0	3	505
C2	-	-	do	3	0	1	1	98
C3	-	-	do	3	1	1	0	212
Total	-	1,776	-	678	457	38	71	2,717
Borders:								
No. 1	-	-	Apr. 8,1944	1	5	2	5	-
No. 2	-	-	do	12	10	0	1	-
No. 3	-	-	do	10	21	3	8	-
No. 4	-	-	do	4	5	2	1	-
Total	-	-	-	27	41	7	15	-
Grand Total	-	1,776	-	705	498	45	86	-
Percent Survival	-	-	-	80.5	55.3	-	-	-

that the experimental bed is not exactly comparable to an area which has been commercially stripped of mussels. The experimental bed was immediately surrounded by an unexploited mussel area which could be the source of the unmarked mussels which entered the plots. Such a repopulating of a stripped area would not be as readily possible on a large area from which most or all mussels had been removed.

Since the greater part of the unmarked mussels found on the experimental bed were seed mussels, the numbers and average sizes of these small mussels were analyzed to determine the effect of the type of plot on spat setting. Any mussel on the bed with a length of .50 inches or less in December was considered to belong to that year's spat. No significant differences were found.

A highly significant difference is evident, however, between the survivals of the transplanted and the replanted mussels. This difference is readily apparent in the percentage survivals in Table 11--80.5 percent of the transplanted mussels had survived in contrast to a survival of 55.3 percent for the replanted mussels. No significant difference appears between the rows and columns of the bed.

Consideration of the data shows that the replanted mussels, both alive and dead, were recovered on the borders and on the plots other than those on which they were planted, about twice as frequently as were the transplanted mussels--46 specimens (5.25 percent) of the total transplanted mussels and 92 (10.2 percent) of the replanted mussels had strayed from their plots. Thus, part of the

apparent lower survival rate of the replanted mussels may have been due to migration from the bed and beyond the borders. Migration would also affect the recovery of transplanted mussels, but to a lesser extent. It is evident, however, that the replanted mussels suffered a greater mortality than the transplanted ones, for 9.6 percent of the total replanted mussels were recovered as dead, but only 5.1 percent of the transplanted mussels were found to have died.

A probable explanation of the different survival rates of the two lots is that the transplanted mussels were more vigorous than the replanted ones, and were able to adapt themselves better to conditions on the bed. In order to remain on the bed, the mussels would have to attach byssal threads quickly to other mussels and mussel shells or risk being carried off by tidal action. When the mussels were placed on the bed, few of them were attached to each other. Undoubtedly, the marked difference in survival warrants additional study and experimentation for clarification.

Table 12 - Growth of Marked Mussels on Plots

Date	Type of Mussel	Quantity in Sample	LENGTH IN INCHES 0.75 to 0.99	1.00 to 1.24	1.25 to 1.49	1.50 to 1.74	1.75 to 1.99	2.00 to 2.24	2.25 to 2.49	2.50 to 2.74	2.75 to 2.99	Average Length 1/	Average Increase	Percent above 2 Inches
		No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	Inches	Inches	%
June 21,1943	Transplanted	96	-	9	31	27	21	2/8	-	-	-	1.597	0.475	3.3
Dec. 21,1943	do	678	-	-	7	46	185	294	128	16	2	2.072		64.9
June 21,1943	Replanted	151	10	33	41	32	26	2/9	-	-	-	1.476	0.450	6.0
Dec. 21,1943	do	457	-	1	8	86	203	120	37	2	-	1.926		34.8

1/Calculated from ungrouped measurements.
2/These mussels measured between 2.000 and 2.032 inches.

Analysis of the data on growth of the mussels does not reveal any significant difference between the rate of growth of the two lots of marked mussels. Neither is there any apparent difference between the growth increment of the marked mussels found on the plots and on the borders. The replanted and transplanted mussels grew at about the same rate during the 6-months period that they were on the bed and border, as shown in Table 12.

The mussel bed experiment has demonstrated that, under conditions prevailing on a Boothbay Harbor mussel bed, small mussels returned or transplanted to the bed have a relatively high survival. This refutes the oft-heard statement that replanting mussels is always useless because of the ensuing high mortality.

A minimum size regulation of two inches could be readily applied, easily enforced, and would be of little inconvenience to the fisherman. After culling, he would hold the small mussels in burlap bags suspended in water or put them into submerged crates. On the following day or soon after, the mussels could be returned to the beds from which they were taken. As indicated in the results of the planting experiment, most of the small mussels between one and two inches would be ready to harvest either later in the same season or during the next season. The minimum size regulation would be most applicable to the Maine beds; in Massachusetts, the problem may be quite dissimilar, for in 1942-43, only large mussels existed on the commercially important beds in Cape Cod Bay and Nantucket Island.

The mussel fishery has great potentialities and every effort should be made to insure that the resource is not misused. It is only by further study and by the utilization of conservation measures based on such study that this shellfish resource can be maintained or increased.

LITERATURE CITED

COULTHARD, H.

1929. Growth of the sea mussel. Contrib. Canad. Biol. (n.s.) 4, 1929. pp. 121-136.

FIELD, IRVING A.

1910a. Sea mussels and dogfish as food. Bulletin, U. S. Bur. of Fisheries, vol. XXVIII, 1908, Part 1, pp. 241-257, illus.

1910b. Utilization of sea mussels for food. Trans. American Fisheries Society for 1910, pp. 159-168.

1911. The food value of sea mussels. Bulletin, U. S. Bur. of Fisheries, vol. XXIX, 1909, pp. 85-128, illus.

1913. The sea mussel industry. Trans. American Fisheries Society for 1913, pp. 131-142.

1922. Biology and economic value of the sea mussel (Mytilus edulis). Bulletin, U.S. Bur. of Fisheries, vol. XXXVIII, 1921-1922, pp. 127-259, illus.

FREY, DAVID G.

1946. Oyster bars of the Potomac River. U. S. Fish and Wildlife Service, Special Scientific Report No. 32, 93 pp., illus.

HERDMAN, W. A.

1904. Recent investigations on pearls in shellfish. Report, Lancas. Sea-Fish. Lab. for 1903, pp. 88-97.

HERRINGTON, W. C. and SCATTERGOOD, L. W.

1942. Sea mussels. A potential source of attractive low cost sea food from the Atlantic Coast. U. S. Fish and Wildlife Service, Fish. Leaflet No. 11, 5 pp.

1943. New England mussels, attractive low-cost seafood now available. Fishing Gazette, 60 (1), pp. 24, 29, illus., Jan. 1943.

HOBSON, A. D., STORROW, B., LEACH, T. S., and WRIGHT, F. S.

1935. A survey of the mussel beds at Blyth, Budle Bay, and Holy Island. Report, Dove Mar. Lab. Cullercoats (3), 3, pp. 27-36, illus.

HUNTSMAN, A. G.

1918. The vertical distribution of certain intertidal animals. Proc. & Trans. Roy. Soc. Canada, Series III, vol. XII, Section IV, pp. 53-60, illus.

JAMESON, H. L.

1902. On the origin of pearls. Proc. Zool. Soc. London, 1902, pp. 140-165.

LAMBERT, L.

1935. Mytiliculture. La culture de la moule en Hollande. Rev. Trav. Peches Marit. Paris 8, 1935, pp. 431-480, illus.

LOOSANOFF, VICTOR L.

1942. Methods for cultivation of edible mussels. Atlantic Fisherman, 23:6, pp. 6-20.

1943a. Cultivation of the edible mussel. Southern Fisherman, Jan. 1943, pp. 10, 25-27.

1943b. Atlantic sea mussels as food. Fishery Market News, January 1943, Vol. 5, No. 1, pp. 4-5.

1943c. Potential mussel production analyzed. Atlantic Fisherman, Sept. 1943, pp. 12, 26.

MOSSOP, B. K. E.

1921. A study of the sea mussel (Mytilus edulis Linn.) Contr. Canad. Biol. 1921, No. 2, pp. 17-48, illus.

1922. The rate of growth of the sea mussel (Mytilus edulis Linn.) Trans. Royal Canad. Inst. Toronto, 14, part 1, 1922, pp. 3-22.

NEWCOMBE, C. L.

1935. A study of the community relationships of the sea mussel, Mytilus edulis L. Ecology, 16, 2, pp. 234-243, illus.

STAFFORD, J.

1912. On the fauna of the Atlantic Coast of Canada. Third Report-Gaspe, 1905-1906. Contrib. Canad. Biol. 1906-1912, pp.45-67.

STORROW, B .

1940. Experiments in transplanting mussels at Whitby. Rept. Dove Mar. Lab. Cullercoats, 1939, pp. 17-20.

WARREN, A. E.

1936. An ecological study of the sea mussel. (Mytilus edulis Linn.) Journal, Biol. Bd. Canada 2, pp. 89-94, illus.

THE SHRIMP AND THE SHRIMP INDUSTRY OF THE SOUTH ATLANTIC AND GULF OF MEXICO

Nutritive Value of Shrimp: Shrimp possess the same general food properties that are commonly attributed to fishery products. In general, marine products are an excellent and economic source of highly digestible proteins, a good source of vitamins, and an excellent source of minerals in quantity and variety. Shrimp are unusually rich in minerals and contain a high natural content of iodine. As a consequence, shrimp like other marine foods are ideal for those areas in which goiter is prevalent. It is well known that iodine deficiency in the diet is the cause of the most prevalent type of goiter. Shrimp also contain vitamins A and D.

—Fishery Leaflet 319

September 1949

NUTRITION: Work is being continued on the vitamin B_{12} assay using purified vitamin B_{12}. In the present method being tested, an excessively long incubation period was required and, furthermore, the bacteriological media was exceedingly expensive. Attempts are being made to use a lower-priced media and also to reduce the incubation period.

PROCESSING: Work was initiated on the processing of fish eggs and fish viscera for use as hatchery food. Several preliminary canned packs were made to determine the optimum processing conditions necessary for canning these materials in large sized cans.

ANALYTICAL METHODS: Studies were initiated by a student fellow on the extraction of oil and vitamin A from fish livers of low oil content. Attempts will be made to correlate the vitamin A recovery with the amount of oil extracted from the livers.

REFRIGERATION: At the end of 10 months of storage, the palatability scores for the striped bass fillets fell below the figure for an acceptable product. Nearly equal scores were obtained for the samples held at a constant temperature of -10° F. and at temperatures fluctuating between -10° and 0° F. A slightly lower score was obtained for the lot held at a constant temperature of 0° F. All lots showed surface desiccation, and a definite fishy odor was apparent upon thawing the samples. The color of the samples held at these temperatures had remained reasonably satisfactory.

Volatile acid numbers have followed very much the same trend as shown by the palatability scores. The quantity of "drip" occurring upon thawing the fillets has shown very little change. No appreciable effect due to fluctuating temperatures is apparent.

* * *

In the tests with wrapping and glazing combinations, the fish that were first wrapped in vegetable parchment and dipped in water, then wrapped in cellophane showed localized desiccation.

PRESERVATION: Twenty experimental lots of salmon cannery waste were prepared for studies of possible procedures for preserving and storing the material for periods of 5 to 20 weeks. The waste was coarsely ground and treated with various proportions of a preservative. Some lots were cooked and others were adjusted to pH 4.7.

Fisheries Technological Research Program, 1949-50

Heads of the laboratories of the Technological Section of the Branch of Commercial Fisheries conferred with Washington officials in July for the purpose of reviewing the laboratory program for the preceding year and setting up a fisheries research program for fiscal year 1950. In accordance with the policy set up last year (Commercial Fisheries Review, August 1948, p. 31), representatives of industry and labor were invited to the conference by the Service to discuss the tentative program and to offer any suggestions that would aid the Section in directing the research program toward the most efficient use of funds available for solving problems of greatest urgency to the fishermen and the fishing industry.

Because of their importance and because of the need for more data, some of the projects of the preceding year are to be continued. Others have been completed and results will be reported in the near future. Several new projects have been added in view of newer developments and the increasing needs of the industry.

The program for the present fiscal year, ending June 30, 1950, is outlined below according to subject, without reference to the laboratory to which each subproject is assigned. The laboratories in which the various phases of the program will be conducted are located at Boston, Massachusetts; College Park, Maryland; Ketchikan, Alaska; and Seattle, Washington.

NUTRITION:

1. Determination of food values of fishery products as prepared for serving. Information on the nutritive value of cooked fishery products as served is required by nutritionists, dietitians and members of industry. Data on the nutritive value as prepared for serving is the only accurate method of determining the ultimate food value. Practically no data has been available on cooked products. To date, approximately 250 fish dishes have been analyzed for dry matter, protein, fat, and carbohydrate and for calorific values. This project is being carried over from last year.

FISHERIES LABORATORY IN SEATTLE, WASHINGTON, WHERE BOTH TECHNOLOGICAL AND BIOLOGICAL FISHERIES RESEARCH ARE CONDUCTED. THE PILOT PLANT OF THE FISHERY TECHNOLOGICAL LABORATORY IS SHOWN IN THE LOWER LEFT.

2. Determination of rate of digestion of certain fishery products. Rate of digestion may be closely associated with the satiation value of fishery products and is a factor bearing upon the nutritive value of the product. Lack of personnel and equipment delayed progress on this project. Development of a suitable method of evaluation was a necessary prerequisite. Rats were fed known quantities of radioactive phosphorus and the rate of passage through the gastro-intestinal tract was followed by electric counter. Other methods were also tested. Gastric evacuation time for baked haddock, broiled mackerel and roast beef is about equal. There was no significant correlation between fat content and rate of gastric evacuation as measured with haddock and mackerel. A method was developed that satisfactorily accounted for the ingested radio-phosphate in the body, however, P^{32} did not prove to be a suitable marker for studying the rate of evacuation since it passed through the walls of the stomach and small intestine much more rapidly than expected. Several new approaches are being considered which have theoretical possibilities of solving the problem. This project is being carried over from last year.

FISHERY TECHNOLOGICAL LABORATORY IN COLLEGE PARK, MARYLAND, IS LOCATED ON THE CAMPUS OF THE UNIVERSITY OF MARYLAND. (THE LABORATORY SERVING THE NEW ENGLAND AREA IS LOCATED IN THE APPRAISERS STORES BUILDING IN BOSTON, MASS.)

3. Chemistry of fish proteins. Investigation of the chemical cause of curd in canned fish, browning of fish during canning, toughening of crab meat and other results caused by changes in fish protein. It would also include investigation of the chemical nature of fish protein which might be of value in obtaining purified fish proteins for industrial use. Study of this problem will entail a thorough search of the literature which will be undertaken as time and personnel are available, but no other work is contemplated for the first year.

4. Utilization of salmon cannery waste for hatchery food. Preliminary tests indicate that salmon cannery waste can serve to replace some of the more expensive and decreasing supply of meat products usually included in the diet of hatchery fish. Tests were initiated to show which parts of salmon waste are most effectively utilized by young fish and how these parts can be processed without loss of nutritional elements. Feeding tests so far indicate: (1) Salmon viscera meal added to the diet at the 10 percent level produces much better growth than does total offal meal. (2) Drying temperature of 100° F. produces a meal of greater growth potential than does 145° F. or higher temperatures. (3) Dried fish meal should not be added to the diet of young salmon before they have reached an age of six weeks nor at a water temperature below 50° F. The present work will be confined to:

(a) Collection and processing of hatchery food;

(b) Analyses of hatchery materials. Particular attention will be paid to assay of vitamin B_{12} in fish waste materials.

5. Clam processing methods and clam toxicity survey. With a view towards reactivating the Alaskan butter clam industry, studies were conducted to develop suitable processing methods for canning butter clams which would result in good quality packs of low or no toxicity. The results of laboratory tests indicate that it is possible to prepare a pack of canned minced butter clams one-tenth as toxic as the original whole clams. On the basis of recommendations from the Ketchikan laboratory, one canner is preparing a small pack of butter clams. Tests on his product indicate that it is safe and suitable for market. This was the first attempt by a commercial packer to reactivate the industry in southeastern Alaska since 1946 when operations had ceased after several shipments of clams had been seized because of the reported presence therein of a toxic substance. The present work will be confined to:

(a) Processing methods including the variations of the pH prior to canning;

(b) Survey of toxic clam areas in order to keep informed as to the possible beds which may become more highly toxic from time to time;

(c) Sampling and testing methods. The results which are at hand will be written up for publication and this portion of the project will be discontinued within the next three months.

6. Preservation of salmon waste. Salmon cannery waste collects at the canneries so rapidly during the height of the season in Alaska that it is impractical to try to handle it immediately. The only hope of complete utilization of this waste is if some way can be developed to preserve it so that processing can be completed over a longer period of time. It is proposed to carry out experiments using different chemical preservatives on salmon cannery waste.

REFRIGERATION AND PRESERVATION:

1. Freezing fish at sea, defrosting, filleting, and refreezing fish. In order to (1) utilize large reserves of food fish existing in northern Pacific and Alaskan waters and (2) to provide methods for improving the quality of North Atlantic fish to make possible the marketing of quality fish as well as to meet the competition of foreign imports of high quality fish fillets, tests were conducted in freezing fish at sea. It was shown that excellent quality fish fillets can be obtained by freezing whole fish at sea, bringing the frozen fish to port where they are stored, thawed, filleted, and refrozen for marketing.

2. Effect of fluctuating temperatures on quality of frozen fish in storage and in transit. With a view toward development of optimum storage temperatures and conditions for frozen fish, studies were conducted to determine the effect of fluctuating temperatures on the quality of frozen fish. Tests indicate that fluctuating temperatures, in themselves, do not have an appreciable effect on the quality. Instead, the average storage temperature encountered during the fluctuations seemed more likely to be the determining factor.

3. Study of Frozen Oysters. This project was initiated with a view toward developing and improving methods of freezing, packaging, and storing of frozen oysters. These studies will consist of:

(a) Use of ascorbic acid and possibly other organic acids to prevent discoloration and oxidation;

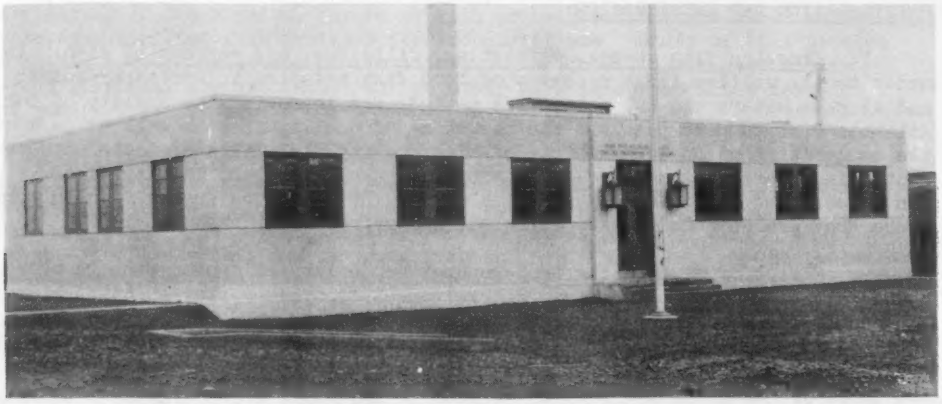
(b) Use of some of the new postwar packaging materials to determine their adaptability in the oyster industry;

(c) Making pH determinations on the oysters prior to processing.

4. Frozen storage life of certain Pacific fish. Several species of Pacific Coast fish, such as rockfish, Dungeness crab, king crab, pink salmon, and Alaskan flounders and pollock, need additional study on the storage life at low temperatures and on the methods of preparation and packaging for freezing. New techniques of packaging, including the use of antioxidants, should be applied to species which deteriorate rapidly during storage to determine the most effective methods of retaining the fresh fish characteristics. The studies will be directed towards determining the palatibility characteristics of the various species during frozen storage and to determine the most effective methods of packaging and storing those species which have a limited storage life. Considerable data have already been collected on king crab and a report has been published on rockfish (Commercial Fisheries Review, July 1949, p.1).

5. Studies of methods of handling frozen salmon to be used for canning. Much salmon is being frozen in remote areas of Alaska for canning at existing canneries elsewhere. Last year considerable processing difficulties developed and some packs prepared from frozen salmon did not pass inspection. It is proposed to study freezing and storage techniques to see how they affect the final canned product.

6. Freezing of pink salmon. Pink salmon, which fades badly when canned, remains a bright pink when frozen. After only a few months cold storage, however, it discolors badly. It is proposed to try some of the newly developed techniques, such as application of antioxidants, in an attempt to develop a product with a suitable storage life.



ORIGINAL BUILDING OF THE FISHERY PRODUCTS LABORATORY IN KETCHIKAN, ALASKA; IS OPERATED JOINTLY BY THE FISH AND WILDLIFE SERVICE AND THE FISHERIES EXPERIMENTAL COMMISSION OF ALASKA.

PROCESSING AND CURING:

1. Canning of little tuna. This new fish off the Middle Atlantic Coast offers possibilities of becoming an important canned product. Studies will be made to establish recommended practices on preparation and processing.

2. Preparation of the manual "The Curing of Fishery Products." The final stages of reviewing and editing the manuscript on "The Curing of Fishery Products" are nearly completed. The report will serve as a technical handbook on the principles and methods of fish curing.

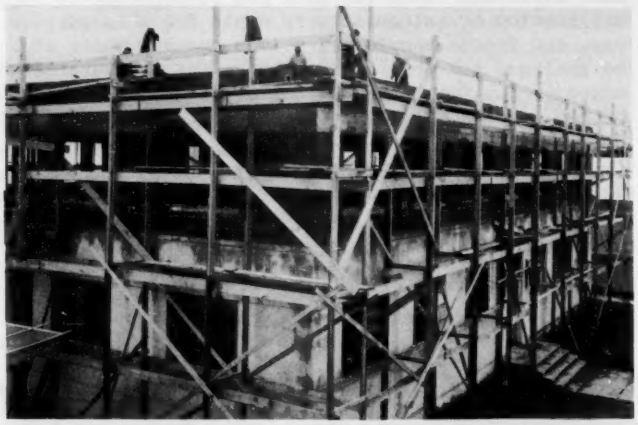
SANITATION AND BACTERIOLOGY OF FISH:

1. Isolation and identification of microorganisms from fish and the holds of fishing vessels to determine their role in fish spoilage. Isolation and identification of microorganisms from fish and the holds of fishing vessels were made to determine their role in fish spoilage. To develop effective methods for improving general quality of fishery products, it is necessary to obtain information of the types of bacteria responsible for fish spoilage. Several hundred cultures have been examined to date. The samples now on hand will be completed and no new samples will be started. The data collected will be summarized into a report. The project will be dropped in order that the personnel can be shifted to other projects of more immediate importance.

2. Handling crab meat. Studies are to be made to establish recommended practices for the handling of this highly perishable product, making use of such data on this subject as have already been collected by the laboratory personnel.

ANALYSIS OF FISH:

1. Cooperative work with the Association of Official Agriculture Chemists on the determination of oil in fish meal. Studies were made to improve the A.O.A.C. recommended methods for fat determination in fish meal since the present methods are totally inadequate and give results as much as 20 percent of true value. Accurate testing methods are necessary to avoid confusion between buyer and seller of fish meal. The fact that the apparent fat values decrease as the meal ages merely adds to the confusion. The work was limited to improving the precision of the acetone extraction procedure. It was shown that (1) no difference resulted from use of paper or alundum thimbles, (2) the height of thimbles could be varied about 50 percent without affecting the results, (3) in the



KETCHIKAN FISHERY PRODUCTS LABORATORY. SHOWS CONSTRUCTION IN PROCESS FOR THE ADDITION OF A SECOND STORY TO THE ORIGINAL BUILDING.

particular Bailey-Walker equipment used, the rate of extraction varied with the position of the extraction flask, (4) anhydrous and recovered acetone gave the same results, (5) rates of distillation are significant variables. Further tests during the preceding fiscal year were discontinued because of lack of personnel and urgency of other projects. During the present fiscal year, the work will be projected towards developing an improved procedure so that as near to 100 percent as possible of the oil in fish meal is extracted under all conditions, regardless of the age of the meal.

2. Correlation of biological and spectrometric methods for the determination of vitamin A potencies. Much additional data were required by the American Oil Chemists Society and members of the Vitamin A industry on the factors affecting the biological assay of Vitamin A and correlation of the biological and spectrometric data. Biological data to date indicate that one unit per day feeding of U.S.P. standard Vitamin A is too little for a positive assay, and that a three unit level is too much. The levels now used are $1\frac{1}{2}$, $1\frac{3}{4}$, 2, $2\frac{1}{4}$, and $2\frac{1}{2}$ units per day. Collaborative spectrophotometric data of U.S.P. Vitamin A study were obtained under sponsorship of the Committee of Revision of the U. S. Pharmacopoeia. Other tests indicate that the U.S.P. Reference Standard is reliable for at least a year when stored as specified. It is the objective of the present study to derive basic information about the two methods in question in order to recommend proposals which will result in improved correlation.

BYPRODUCTS:

1. Determination of the vitamin A content of fish and fish livers. To determine potential sources of oil and vitamin A in fish and fish livers, analyses were made of fishery products obtained from Alaskan and Atlantic Coast waters. Data on a limited number of fish have been collected to date. A report on a phase of this project is in preparation.

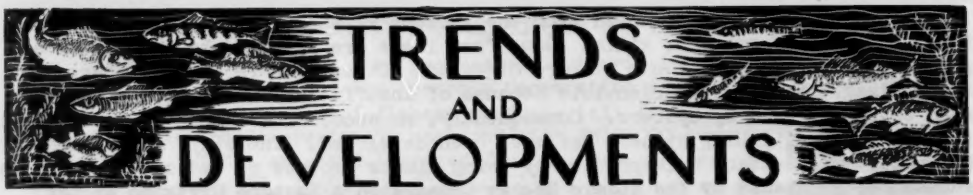
2. Cooperative tests with Petersburg, Alaska, fur farm. The U. S. Department of Agriculture operates an experimental fur farm at Petersburg, Alaska. Here different diets for mink are tested and the Department is interested in utilization of salmon cannery waste for this purpose. It is proposed to collect, can, and freeze samples of salmon cannery waste at Ketchikan. These samples will be analyzed for protein, fat, ash, and moisture at the Service's Ketchikan laboratory, and for certain vitamins at the Service's Seattle laboratory. The bulk of the samples will then be shipped to Petersburg for feeding tests.

FISH FACTS

DO YOU KNOW .....

That touch is the most highly developed sense of fish. Organs in the form of buds or small pits in contact with the nerves are distributed over the entire body and are especially numerous in the barbels and feelers .....

--Fishery Leaflet 132



Additions to the Fleet of U. S. Fishing Vessels

First documents as fishing craft were received by 105 vessels of 5 net tons and over during August 1949—57 less than in August 1948, according to the Bureau of Customs of the Treasury Department. California led with 33 vessels documented, followed by Washington with 11, and Florida with 10. A total of 727 vessels were documented during the first 8 months of 1949, compared with 844 during the corresponding period in 1948.

Vessels Obtaining Their First Documents as Fishing Craft, August 1949

Section	August		Eight mos. ending with August		Total
	1949	1948	1949	1948	1948
	Number	Number	Number	Number	Number
New England	5	7	25	39	52
Middle Atlantic	4	4	38	34	40
Chesapeake Bay	5	7	49	36	59
South Atlantic and Gulf	38	80	243	355	541
Pacific Coast	46	53	262	270	347
Great Lakes	2	4	31	33	51
Alaska	4	7	75	70	81
Hawaii	-	-	3	7	12
Unknown	1	-	1	-	-
Total	105	162	727	844	1,183

Note: Vessels have been assigned to the various sections on the basis of their home ports.

Atom Energy to Aid Shellfishery Research

An agreement has been concluded between the U. S. Fish and Wildlife Service and the Atomic Energy Commission to conduct cooperative research on shellfish and other marine organisms using radioactive tracer methods. The Acting Director of the Service announced on October 14 that the new research project--a survey of radioactivity in marine invertebrate animals--will be conducted at the U. S. Fisheries Biological Laboratory at Beaufort, N. C. The agreement between the Service and the AEC provides for cooperative financing and supervision of the research project.

One main objective of the study is to learn more about the accumulation in marine life of radioactive material and its possible effects on shellfish.

Another objective is to learn more about the natural foods required by oysters for growth and fattening. Conditioning oysters for market has always been a problem of oyster growers.

It has long been known that oysters feed on one-celled plants and animals and other minute organisms or plant detritus normally abundant in sea water.

These food materials are removed from the gallons of water per day which are filtered through the oyster's gills. Some food items are accepted by the oyster and passed into the mouth but not all are digested. Others are rejected. There is still disagreement among scientists because of insufficient information on the food organisms used by oysters. Consequently, no successful method of artificially feeding or conditioning oysters has ever been developed. The staff of the Beaufort Laboratory will attack this problem by using minute amounts of radioactive chemical substances furnished by the Atomic Energy Commission's Isotope Division at Oak Ridge, Tennessee.

The organisms supposed to be the food of oysters will be grown in water containing radioactive chemicals which they will absorb. The activated organisms will then be fed to experimental oysters in the Laboratory and the nutrients which are digested and incorporated into the tissues will then be determined chemically and by radiation measurement.

This is the "tracer technique" made possible in the last three years by the use of radioisotopes produced and distributed by the AEC for widespread research throughout the nation and in other countries. Because of the sensitivity of the new instruments for measuring minute amounts of radiation, the analysis of the chemical composition of any substance containing radioactive tracer atoms, even to a millionth of one percent, is far more accurate than was possible by conventional chemical methods.

Draft Agreement Accepted for General Mediterranean Fisheries Council

A six-country conference was held in Rome at the European Regional Office of FAO, September 19 through September 23, 1949, for the purpose of establishing a General Fisheries Council for the Mediterranean, according to an announcement from FAO headquarters in Washington, D. C. The delegates unanimously accepted a draft agreement for the establishment of a regional council for the scientific exploration of the sea in the Mediterranean Sea and contiguous waters. It will be referred to the next Annual Conference of FAO in November 1949 and then submitted to interested FAO Member Countries. If ratified by five of them, it will become effective. The meeting was attended by delegates from France, Greece, Italy, Lebanon, Turkey, and Yugoslavia.

Meanwhile an interim committee will undertake the preparatory work.

The status of the forthcoming General Fisheries Council for the Mediterranean is on the whole analogous to that of the Indo-Pacific Fisheries Council and calls for coordinating of research and recommending to Member Governments measures necessary to make the best possible use of the resources of the sea. (See Commercial Fisheries Review, October 1949, page 29.)

ECA Procurement Authorizations for Fishery Products

During September 1949, the procurement authorizations for commodities and raw materials announced by the Economic Cooperation Administration included $523,000 for the purchase of fishery products (all from the United States and Possessions), compared with $818,000 during August 1949. Total amount authorized for the 18-month period through September 30, 1949, was $34,840,911.

ECA during September announced the decrease of $150,000 in authorizations to be used by Italy for the purchase of salted fish from Canada and $233,000 to be used by Ireland for the purchase of canned fish from the United States and Possessions.

Details of the ECA program to give small independent firms a greater chance to supply goods for European recovery were announced in September. Program provides small independent firms with a counseling service in exporting under the

ECA Procurement Authorizations for Fishery Products, September 1949

Product	Country of Origin	Recipient Country[1]	Amount Authorized
Canned Fish	U. S. & Possessions	Belgium-Luxembourg	$ 500,000
Sperm & polymerized fish oil	U. S. & Possessions	France	23,000
Total for Sept. 1949			523,000
Total ECA Procurement Authorizations for Fishery Products, April 1, 1948-Sept. 30, 1949			
Fish, canned	U. S. & Possessions & Canada	United Kingdom, Ireland, Greece, Italy, Belgium-Luxembourg	14,849,800
Fish, salted or cured	Newf., Canada, & U. S. & Possessions	Italy & Fr. W. Indies	5,079,000
Fish meal	Canada, Iceland, Norway, Angola	Denmark, Austria, & Bizone Germany	3,956,361
Oil, herring	Iceland	Bizone Germany	1,694,000
" , seal	Newfoundland	France	257,600
" , shark liver	Latin America except Argentine & Brazil	France	250,000
" , fish	U. S. & Possessions	Bizone & French Zone of Germany & Korea	845,000
" , technical fish	U. S.	Bizone Germany	100,000
" , whale (includes sperm oil)	Netherlands, Belgium, Norway & U. S.	Austria, Bizone & French Zone of Germany	7,056,150
" , whale and fish	U. S. & Possessions	Korea	162,000
" , sperm & polymerized fish	U. S. & Possessions	France	23,000
Vit. A (Commercial grade, for stock feed)	U. S.	Netherlands	567,000
Grand Total Authorized			34,840,911

1/Unless otherwise indicated, the recipient country is the procuring agency, and the Government of the participating country or its authorized agents or importers do the purchasing.

Marshall Plan; information of potential purchases to be made in the United States; names and addresses of European importers and the products they have purchased under the Marshall Plan; information regarding commodities which offer the greatest opportunities for sales in Western Europe; and finally, a directory will be compiled listing names and addresses of potential American exporters, by commodities. This directory will be for overseas distribution and will be available through ECA

overseas missions to European importers seeking additional American sources of supply. ECA emphasized that it is a financing agency and does not do any buying nor does it obtain orders for any business enterprise. Such orders must be sought by each company in regular commercial channels or through participating Governments' procurement agencies.

In its effort to aid the small independent enterprises, ECA has added to its procurement authorization forms a new provision calling the attention of Marshall Plan countries to the commodities and services offered by small American business firms.

Federal Purchases of Fishery Products

DEPARTMENT OF THE ARMY, August 1949: During August 1949, the Army Quartermaster Corps purchased 1,751,935 pounds (valued at $506,464) of fresh and frozen fishery products for the U. S. Army, Navy, Marine Corps, and Air Force for military feeding (see table). Purchases during the month were 20 percent greater in quantity than in July 1949 and 5 percent more than in August 1948. However, the value of the August purchases this year was only 4 percent higher than in July 1949, and 9 percent less than in August 1948.

Purchases of Fresh and Frozen Fishery Products by Department of the Army
(August and January through August 1949 and 1948)

QUANTITY				VALUE			
August		January-August		August		January-August	
1949	1948	1949	1948	1949	1948	1949	1948
lbs.	lbs.	lbs.	lbs.	$	$	$	$
1,751,935	1,662,509	11,089,988	11,100,651	506,464	558,668	3,636,905	3,931,998

Purchases for the first eight months in 1949 were only .1 percent less in quantity, and 8 percent less in value, compared with the corresponding period a year ago.

Fishery Biology Notes

"ALBATROSS III" - CONTINUES CENSUS OF FISH POPULATION (Cruise 28): A census of the fish population was the chief purpose of Cruise 28 (September 6-16, 1949) of the North Atlantic Fishery Investigations' vessel, Albatross III. During the cruise, 35 half-hour tows were made at 32 stations in depths up to 120 fathoms. Hydrographic observations, consisting of water temperatures and bottom topography, were also collected.

Large haddock were found in commercial quantities on Fippennies and about 35 miles southeast of Cashes Ledge in more than 100 fathoms. Catches varying from 7 to 21 bushels of market-sized rosefish were taken in the vicinity of Fippennies, Jeffreys Banks, Cashes Ledge, Platts Bank, and Mt. Desert Rock.

A scientist from the Bingham Oceanographic Foundation at Yale University was aboard the vessel during this cruise. He collected large numbers of sponges, sea urchins, and other invertebrates common to the Gulf of Maine.

NEW FISHERIES RESEARCH VESSEL: A new Fish and Wildlife Service fishery research vessel, Sablefish, was launched at Seattle on August 31. This seiner-type vessel will be used by the Service's Branch of Fishery Biology for herring and pink salmon investigations in southeastern Alaska.

DR. VAN OOSTEN TO DEVOTE TIME TO RESEARCH: The direction of the Service's Great Lakes Fishery Investigations at Ann Arbor, Mich., has been taken over temporarily by Dr. Ralph Hile in order to permit Dr. John Van Oosten, chief of the Investigations since 1927, to devote his time exclusively to the fields of fishery research and writing, according to an October 13 announcement. However, Dr. Van Oosten will continue to assist the Service and other cooperating agencies in an advisory capacity in matters affecting the Great Lakes fisheries.

With the Service about to undertake an expanded program of investigations into the depletion of the fisheries of the Great Lakes due to the depredations of the sea lamprey, this will provide Dr. Van Oosten an opportunity to study and release much valuable data on the fisheries of that area for use as background for the new studies.

SARDINE SPAWNING AREA DISCOVERED OFF CENTRAL CALIFORNIA: Sardine larvae were collected August 14 and 15 at stations about 35 and 70 miles offshore, midway between San Francisco and Monterey by the Service's research vessel, Black Douglas, according to a report from the Chief of the South Pacific Fishery Investigations. These larvae were about an inch long and approximately two months old. This discovery indicates that sardine spawning took place off central California in June of this year. In June 1946 and May and June 1939 the Service collected sardine eggs and/or larvae north of Point Conception. The California Division of Fish and Game also collected them there in March and May 1931 and in May and April 1930.

An important sardine spawning area is known to exist south of Point Conception, off southern California. The importance of spawning grounds to the north of Point Conception is unknown at present. This is one of the questions to be answered by the cooperative sardine research program being conducted by the California Academy of Sciences, California Division of Fish and Game, Scripps Institution of Oceanography, and the Fish and Wildlife Service.

SERVICE STUDYING SPONGE DISEASE OFF FLORIDA: The sponge industry in waters off Florida and Cuba is threatened by a new disease which in the last few months has put an end to sponge fishing from Tarpon Springs to St. Marks, Florida, the Service reported October 3.

A study of the sponge disease by the Service has been under way in cooperation with the Florida State Supervisor of Conservation and the University of Miami Marine Laboratory. Boats making the survey are the FWS Pompano and the Athens—the latter boat and crew being donated by a sponge fisherman.

Commercial sponges, non-commercial sponges, and varieties of coral are killed by the disease, which was first noticed in December 1948. A similar disease in 1938-39 killed practically all sponges in waters deeper than 10 fathoms. At present, most of the remaining sponges--now hit by disease--lie within four fathoms.

Fishery Outlook for October-December

Sharp competition in the marketing of its products faces the U. S. fishing industry during the remainder of 1949, according to the October-December quarterly outlook report released by the Service on October 17.

Prospective large supplies of fishery products, augmented by increased imports and decreased exports, and ample quantities of other foods in the market (particularly meats) are given as the basis for the prediction.

Supplies of fish will remain plentiful throughout the last quarter of 1949, although fishing activities in most areas will decline with the winter season. Holdings of frozen fishery products are near record levels for this time of year and stocks of canned fishery products are in fair to good supply. In foreign trade, the reports shows that fishery exports from the United States have been small and imports large. The devaluation of foreign currencies may tend to increase this imbalance.

Fresh and Frozen Fish Report in Response to H.Res. No. 174 (81st Congress)

A report on fresh and frozen fish was completed and transmitted to Congress late in September by the Secretary of State, the Secretary of Commerce, and the Tariff Commission in compliance with the request contained in House Resolution 174, 81st. Congress, adopted June 20, 1949. This resolution requested these agencies to make an immediate study of the effect on the domestic fishing industry of increasing imports of fresh and frozen fish and to submit a report by September 15. The report was submitted to the House of Representatives by the Department of State on September 15, 1949. The Tariff Commission did not consider it appropriate to join in the conclusions and recommendations because of the possibility that the Commission will be called upon to make findings and recommendations with regard to this subject under Executive Order 10004 which provides for the administration of the Escape Clause in trade agreements.

Report deals with fishery products for human consumption (as distinguished from fish used for fish meal, oil, and miscellaneous nonfood purposes). It consists of four sections. Section A deals with a general discussion on the scope of the report; total production, exports, and imports; tariff status of fishery products; fisheries by regions; species of fish involved; prices, and a resume of the fishing industries in principal countries supplying United States imports of fresh and frozen fish. Section B is concerned with fresh and frozen fillets and the species of fish involved; production, imports, and exports; foreign production; United States import duties; consumption; factors influencing production and imports, together with Government assistance to fisheries enterprises in the United States, Canada and Newfoundland; and factors affecting domestic and foreign costs of fillets, including wage rates, prices paid for fish, and the price trend of fish for filleting in the United States; and a specific analysis of groundfish fillets. Section C contains a discussion of fresh or frozen fish (other than fillets), and includes general comment and tariff status of each of the following species: salmon, halibut, mackerel, swordfish, sturgeon, fresh-water fish and eels, smelts, sea herring, tuna, and fresh or frozen fish or other species. Section D contains the conclusions and recommendations, describing the general impact of foreign competition, and discussing the possible courses of action.

Conclusions: In considering the general impact of foreign competition upon the United States fishery industry, the report concludes: "It is clear however, from the foregoing data that the industry as a whole has, over the years, steadily grown and that it has been sustained by a vigorous demand for fish products on the part of the population of the United States...." Subject to certain qualifications, the report further concludes that "there is reason to believe that the United States market will continue to support expanding domestic production even should imports continue to increase. The domestic industry has been active; prices in general have been at profitable levels. Generally speaking, the industry is in a much better position than it was before the war, and the long-term upward demand trend for its products seems reasonably secure...."

With reference to costs, the report points out that "The United States filleting industry generally appears to pay higher wage rates and higher prices for its raw fish than its foreign competition. However, against the foreign filleters' advantages as regards wage rates and prices of raw fish, the United States industry also has certain advantages, such as its proximity to important centers of consumption...."

The more important courses of action suggested by Government and the industry to assure a continuing state of health and activity for the industry are discussed by the report. Referring to quantitative import restrictions, the report points out that "The United States, in conformity with its basic policy of encouraging the avoidance by the world in general of quantitative import restrictions, has joined with a great many other countries, through the General Agreement on Tariffs and Trade, in keeping these restrictions to the minimum....The only way in which this country could be freed of its obligation to refrain from placing quantitative restrictions on fish products would be through procedure under the escape clause in that agreement....

"However, it may be pointed out that on the basis of the data which have been available for preparation of this report, it would not appear that the suspension of any obligations in the General Agreement is needed to protect the existing domestic fishing industry....

"Aside from the fact that quantitative restrictions on imports do not appear to be needed to protect the domestic fishing industry their establishment might have an injurious effect upon the whole conduct of the United States policy of avoiding unnecessary barriers to the flow of trade....

"But apart from these larger objectives the immediate interests of consumers and distributors also must be considered. Frozen groundfish fillets, for instance, are of special importance to consumers in the Midwest and other inland areas, who, in addition to purchasing large quantities of domestic fillets, have indicated an increasing desire for certain imported fillets...."

In regards to subsidization which might be employed to aid the fishing industry, the report calls attention to Article XVI of the General Agreement on Tariffs and Trade, which reads as follows:

> "If any contracting party grants or maintains any subsidy, including any form of income or price support, which operates directly or indirectly to increase exports of any product from, or to reduce imports of any product into, its territory, it shall notify the CONTRACTING PARTIES in writing of the extent and nature of the subsidization, of the estimated effect of the subsidization on the quantity of the affected product or products imported

into or exported from its territory and of the circumstances making the subsidization necessary. In any case in which it is determined that serious prejudice to the interests of any other contracting party is caused or threatened by any such subsidization, the contracting party granting the subsidy shall, upon request, discuss with the other contracting party or parties concerned, or with the CONTRACTING PARTIES, the possibility of limiting the subsidization."

Report finds that "The facts brought out in this report would appear to suggest that a positive course of action directed toward expanding consumption and reducing domestic production costs would be the most appropriate method of meeting the industry's problem of competition...."

The only government aid which the report advocates is the possibility "that the fishing industry would receive direct benefit from any increase in activity in sponsoring aid to small business at large. The Congress perhaps could give important aid to the fishing industry through this program...."

Recommendations: The recommendations made by the report state: "In view of the foregoing analysis it would seem constructive for the Congress to provide funds for the appropriate governmental agencies to cooperate with and aid industry in developing and expanding programs for the further improvement of techniques and facilities for catching, storing, processing, transporting, and marketing of fish.

"If the Congress favors such action, a further study should be made to determine the specific programs to be undertaken and the funds needed to carry them out."

F.A.O. Proposes an International Commodity Clearing House

Creation of an International Commodity Clearing House has been proposed to the 58 member nations of the Food and Agriculture Organization, according to a September 21 news release from that agency.

Operation of ICCH is intended to permit surplus-producing countries to keep output of agricultural commodities at high levels without resort to restrictive measures, destruction of crops, or "dumping" devices.

On the other hand, it would enable importing countries now unable to buy as much food and other agricultural products as they need to take additional amounts, paying ICCH considerably reduced prices in the currency of the supplying country or the full price in their own currency. This currency would be redeemed and the accounts of exporting countries cleared through the general expansion of trade or return to currency convertibility which this and other measures would help to bring about.

The proposed ICCH would be a public corporation with a capital equivalent to $5 billion contributed by member countries in their national currencies. It is proposed to set this up as an action arm of FAO, so that no new international organization would be necessary. It would be operated by a manager appointed by the FAO Director-General, assisted by a board of 15 commodity trade experts elected by the Conference of FAO.

Although fishery products were not specifically mentioned, it is conceivable that they also could be included in this program.

Pacific Oceanic Fishery Investigations

HAWAIIAN TUNA FISHERY: Tuna fishing in Hawaii during July was variable but the fishery for skipjack was very profitable, according to the August report of the Pacific Oceanic Fishery Investigations. Since the skipjack catches were good and regular, they made possible a continuous capacity operation of the local cannery for 40 to 50 hours each week. Toward the end of July the size of the skipjack in the catch had declined to an estimated 15-pound average from the 20 to 25-pounds of the past few months.

Long-line fishing for the big-eyed and yellowfin tunas was poor during early August, but improved toward the end of the month to the point where a landing was comprised of 20 to 25 large tunas. The big-eyed tuna in the catch have passed the spawning season and are now very plump and oily in comparison to their condition during the late spring months.

Bait has continued to be a problem in the tuna fishery in this area. Although the skipjack fleet has found bait available for the most part, the long-line fishermen have been beset with difficulties. Bait has been hard to catch and expensive on the market. For a part of the month, the opelu used for bait cost the fishermen from 50 to 80 cents a pound.

JAPANESE BAIT NET TESTED: Members of the POFI staff and representatives of the Territorial Fish and Game Commission, aboard the latter's research vessel, Makua, made a 3-day trip to the Kauai Island to test a Japanese bait net. They found the net to be superior for making collections under a light in a rough sea and suitable also for baiting operations in sheltered waters.

STATUS OF VESSELS: The motor vessel US FWS Henry O'Malley left San Diego on October 6 for Honolulu where it will undertake explorations for tuna. This vessel is the first of three fishery research and exploratory fishing vessels to be completed for the Service's Pacific Oceanic Fishery Investigations. A former Navy vessel of the YP 600 class, the Henry O'Malley's conversion was completed on September 27. This vessel will be primarily concerned with experimental fishing for tuna on a commercial scale in the tropical and subtropical seas between Hawaii and the Palaus, and after arrival in Honolulu will probably make a short shakedown cruise of about two weeks in order to test all fishing gear prior to an extended trip.

POFI VESSEL, HENRY O'MALLEY, DOCKED AT SAN DIEGO PRIOR TO SAILING FOR HONOLULU.

Conversion of a second vessel, also of the YP 600 class, will be completed in Tacoma, Washington, in November. This vessel, the US FWS Hugh M. Smith, will sail for Honolulu and will be used primarily for biological and oceanographic research.

The US FWS John R. Manning, which is being constructed as a purse seiner, will join the fleet of vessels being operated by the Service at Honolulu, and will sail sometime early in 1950. This vessel will have four brine wells instead of two as originally planned.

Northwest Pacific Exploratory Fishery Program

The Service began an exploratory albacore survey on August 8 for the purposes of gaining information concerning the abundance, range, and commercial possibilities of this fishery in waters adjacent to Alaska. The US FWS Oregon, a 100' steel tuna vessel, was employed in the work. Equipped for surface and deep trolling, chumming with live bait, and flag-line fishing, the vessel also carried scientific equipment to determine water temperatures and depths, and to make plankton tows.

The vessel devoted the first week to working in waters off the coast of Washington, for the purpose of testing its gear and equipment before starting north. During this time, a good showing of tuna was found 50 miles WSW. of Cape Flattery. This news and other relevant information was broadcast to the fishing fleet, and several vessels made use of the information. During the trip, bait was a major problem, being difficult to find.

The vessel worked up the British Columbia coast and into Alaska coastal waters. Fish were located off Cape Cook and Cape Scott, but were moving very fast. The most northerly point at which tuna were caught was the Walker Seamount area, latitude 55°11' N. and longitude 140°20' W. about 300 miles off Baranof Island. Further fishing activities offshore as far north as Sitka were conducted but no tuna were caught.

Running back towards the south, scattered fish were taken off Dixon Entrance and the northern Queen Charlotte Islands early in September. Then the vessel again proceeded north and made several runs offshore in the Alaska area. These runs extended as far offshore as 150 miles off Baranof Island. The maximum water temperature found was 54.5° F., and temperatures were 2°-2.5° F. colder than recorded a month earlier. No tuna were taken during these runs.

A considerable amount of oceanographic and biological information was obtained during the cruise. Both surface and deep-water temperatures were taken at frequent intervals. This should be of value in future surveys. Examination of the stomach contents of a representative number of albacore caught furnished information concerning feeding habits of these fish in various areas. The vessel returned to Seattle on October 11.

Proposed Split Halibut-Fishing Season

As a means of lengthening the season and increasing the use of the available supply of halibut, the International Fisheries Commission has advanced proposals for a split fishing season in the Northwest halibut fishery. For the information of those interested in the halibut fishery, the Commission has issued a "Memorandum on the Proposed Split Halibut-Fishing Season." According to its memorandum:

The International Fisheries Commission began regulating the Pacific Fishery in 1932. Its 18 years of management has caused great improvement. There has been an almost continuous increase in the stock of halibut on the grounds. As the stock has been carefully built up, the Commission has from time to time allowed larger annual catches. This is now the most prosperous halibut fishery in the world. . . .

The Effects of Regulation Upon the Halibut Fishery: The abundance of halibut on the Coast as a whole has increased about 150 percent and total catch during the past four years has averaged over 56,000,000 pounds annually, an increase of 13,000,000 pounds over 1931. This additional poundage, together with the associated vitamin-bearing livers and viscera, adds over $3,000,000 to the fleets' yearly earnings. In spite of the larger catches permitted each year, the increased abundance has resulted in a 35 percent reduction in the amount of fishing effort required to secure the catch.

These changes in the fishery have directly and indirectly caused pronounced changes in the size and character of the halibut fishing fleet, in the rate at which halibut are landed, and in the length of the fishing season.

The fleet has increased in size not only because of the larger stocks of halibut but also on account of the general increase in number of vessels in other fisheries capable of temporarily converting to the short but profitable halibut fishing season. This, for the most part, occurs during the time when other fisheries are inactive. In 1931, there were 328 vessels engaged in halibut fishing compared to 744 vessels in 1948. In addition, there has been a fourfold increase in the one-man or two-man boats fishing for halibut prior to engaging in other fisheries.

Landings are now at the rate of 30,000,000 pounds monthly when Area 2 and 3 are open as compared to 6,000,000 pounds monthly during the years prior to regulation.

The length of the fishing season has declined from 245 days in Area 2 in 1931, to 34 days in 1949. In Area 3, the decline has been from 245 days to 73 days in the same period. The present trend indicates that the season in Area 2 may soon be reduced to 25 days and in Area 3 to under 60 days. . .

Conservation Advantage of a Longer Season: There is evidence that the present short fishing season in both Area 2 and 3 is seriously interfering with the attainment of the conservation objectives of the present treaty, namely, to secure and maintain a maximum yield from each stock of halibut. . . .

HALIBUT SCHOONER IN ALASKA INSIDE PASSAGE EN ROUTE TO NORTH PACIFIC BANKS.

MAKING UP A SKATE OF GEAR ABOARD A WEST COAST HALIBUT SCHOONER ON THE WAY TO THE FISHING GROUNDS.

This was pointed out in a report to the United States and Canadian Governments in 1946. The memorandum goes on to state that:

A conservative estimate, based on the 45 percent increase in the annual catches which are being taken without injury to the supply on the always intensively-fished Cape Scott and Goose Island and Upper Hecate Strait grounds, indicates that perhaps as much as 2,000,000 pounds are being lost each year in Lower Hecate Strait and perhaps even more in the outside waters of Southeastern Alaska. It appears that a reasonable extension of the fishing season would bring about a redistribution of fishing effort and avoid a considerable portion of the above losses. Furthermore, an additional 1,000,000 pounds would be gained from growth in weight of the fish by extending the present one-month Area 2 season to to three months.

The Fleet's Efforts to Lengthen the Season: Although the fleets have been interested in the broad conservation aspects of a short season, they have naturally been more actively concerned about the disturbing effect of a short concentrated season on their market. Between 1933 and 1942, with varying success, the fleets controlled the rate of landing of the permitted catch limits, by what became known as the Voluntary Curtailment Program. This program, consisting of trip limits and tie-up periods between trips, did not reduce production but attempted to maintain a season of reasonable length to allow a more orderly marketing of the catches which the Commission's regulations allowed.

The Commission was sympathetic and assisted the fleets with factual information, wherever possible, but did not itself take part in the program. On several occasions between 1933 and 1938, the fleets petitioned the Commission to secure powers that would allow it to provide legal support for their voluntary program. . . .

Commission's Proposals for Lengthening the Fishing Season: The interest of the Commission with respect to maintaining a season of reasonable length underwent gradual change with the subsequent shortening of the seasons, which brought the problem of full utilization of the stocks to the fore. By the end of 1945, in which the Area 2 and Area 3 seasons were only 1½ and 5 months long, respectively, extension of the season had become biologically important. The fact that extension of the season would help the fleet economically was only incidental by that time. . . .

The 1946 Report, which was supported by the industry, recommended treaty changes that would permit lengthening the season by the following two methods:

"(1) Reducing the rate of fishing by a program consisting primarily of tie-ups between trips and secondarily of limitation of the catch per trip, applied to boats individually."

This envisaged a program substantially the same as that successfully followed earlier by the fleets for the economic purpose of securing a more orderly marketing of their catches.

"(2) Reducing the rate of fishing by splitting the fishing season by tie-up periods, simultaneously applied to all boats."

This procedure contemplated the division of the fishing season in an area or areas into two or more fishing periods with intervening closed periods and possibly the assignment of a portion of the annual catch limit to each open period. This split-season method had been examined several times during the preceding 12 years and was considered to possess some impractical administrative and enforcement features. The halibut fleets agreed with the Commission in this opinion but felt that it should be included in the recommendations, inasmuch as conditions might change and render it practicable.

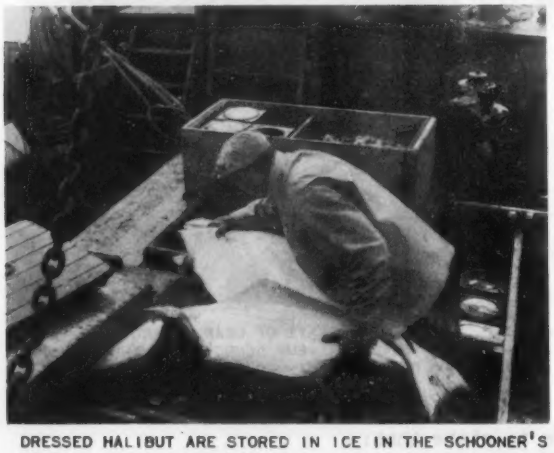
No action having been taken by the Governments on the recommended treaty changes, and conditions having grown worse in respect to the length of season, another proposal for lengthening the fishing season was made by the Conference Board on January 12, 1949, as follows:

"That vessels of all sizes be allowed to make only one halibut trip per month. . ."

This proposal implied that each boat would make its monthly trip at a time of its own choosing. It was similar to the first of the 1946 recommendations in that it provided for tie-ups between trips, individually applied. It differed from it in abandoning the idea of trip limits. The proposal came from a representative from Alaska.

Although there seemed to be merit to this suggestion, it was impossible for the Commission to carry it out under the authority of the present treaty. Consideration of the one-trip-per-month proposal led to a discussion between the fleet representatives and the Commission of the "split season" method as an alternative. It was decided that the conservation benefits of a split season might be so important that they would outweigh its shortcomings.

It was believed that the present treaty might provide the necessary authority for "splitting the season". The proposed change was felt to be of importance that the Commission wished to have the benefit of the opinion of the fleets concerning it before it would act. Accordingly, the representatives present agreed to take the matter up with their various fleets and submit the results to the Commission through the Fishing Vessel Owners' Association in Seattle.



DRESSED HALIBUT ARE STORED IN ICE IN THE SCHOONER'S HOLD.

The Ketchikan, Prince Rupert, Vancouver, and Seattle halibut fleet owners and fishermen were in favor of the split-season proposed, while Juneau halibut fleet owners and fishermen, and Petersburg owners were opposed. No reply was received from the Petersburg halibut fishermen.

In view of the seriousness of the matter, the differences of opinion and the proximity of the opening of the fishing season, the Commission decided to postpone action on the split season proposal during the 1949 season. This would give it an opportunity to secure the views of all interested persons before a decision was made.

However, in view of the above, the International Fisheries Commission announced pub-

lic hearings at various ports on the West Coast during the latter part of September. The main purpose of the hearings was to secure opinions regarding proposals for a split fishing season in the halibut fishery, as a means of lengthening the season and increasing the use of the available supply of halibut.

School Lunch Program, 1949-50

Allocation of funds to the States and Territories for the operation of the 1949-50 National School Lunch Program announced August 2 by the U. S. Department of Agriculture indicates that the program is assuming an increasingly important role. Of the $83,500,000 appropriated by Congress for the 1949-50 fiscal year ($75,000,000 appropriated the previous fiscal year), a total of $64,625,000 has been apportioned to the 48 States, the District of Columbia, and to the Territories of Hawaii, Puerto Rico, Alaska, and the Virgin Islands. Add to this the contributions of the individual States, the revenues obtained through the sales of many of the lunches, and the donations from other sources and the ultimate amount involved will approximate $200,000,000 for the coming year. More than 1.1 billion school lunches were served during the last fiscal year to approximately one-fourth of the Nation's school children.

State	Total	State agency	Withheld for private schools
Alabama	$2,290,495	$2,239,991	$50,504
Arizona	350,947	333,369	17,578
Arkansas	1,785,838	1,754,925	30,913
California	2,603,791	2,603,791	
Colorado	424,360	387,250	37,110
Connecticut	511,428	511,428	
Delaware	86,278	72,942	13,336
District of Columbia	181,136	181,136	
Florida	1,085,485	1,056,906	28,579
Georgia	2,315,262	2,315,262	
Idaho	245,728	238,376	7,352
Illinois	2,339,160	2,339,160	
Indiana	1,507,348	1,507,348	
Iowa	1,163,762	1,050,714	113,048
Kansas	725,089	725,089	
Kentucky	2,100,314	2,100,314	
Louisiana	1,745,553	1,745,553	
Maine	424,895	353,903	70,992
Maryland	695,856	583,769	112,087
Massachusetts	1,440,327	1,121,250	319,077
Michigan	2,220,678	1,911,909	308,769
Minnesota	1,239,294	1,071,192	168,102
Mississippi	2,239,594	2,239,594	
Missouri	1,605,852	1,605,852	
Montana	180,806	166,812	13,994
Nebraska	534,630	481,553	53,077
Nevada	34,414	33,823	591
New Hampshire	223,104	223,104	
New Jersey	1,263,018	1,037,170	225,848
New Mexico	373,279	373,279	
New York	3,395,902	3,395,902	
North Carolina	2,760,998	2,760,998	
North Dakota	217,619	200,056	17,563
Ohio	2,576,365	2,239,314	337,051
Oklahoma	1,461,547	1,461,547	
Oregon	570,728	570,728	
Pennsylvania	3,741,015	3,102,570	638,445
Rhode Island	215,078	215,078	
South Carolina	1,776,427	1,757,206	19,221
South Dakota	269,017	251,162	17,855
Tennessee	2,070,789	2,022,034	48,755
Texas	3,612,744	3,612,744	
Utah	337,983	333,761	4,222
Vermont	167,202	167,202	
Virginia	1,613,536	1,568,681	44,855
Washington	818,033	772,265	45,768
West Virginia	$1,215,067	$1,189,520	$25,547
Wisconsin	1,261,309	1,001,982	259,327
Wyoming	99,920	99,920	
Alaska	11,684	11,684	
Hawaii	89,972	72,746	17,226
Puerto Rico	2,358,953	2,358,953	
Virgin Islands	44,391	44,391	
Total	64,625,000	61,577,298	3,047,702

Funds allocated to the States are used to reimburse participating schools for a part of local purchases of food for school lunches. These purchases, in addition to providing nutritious lunches for local school children, serve to enlarge the market for locally-produced foods. The funds are apportioned on the basis of a formula which takes into account the number of children of school age and the per capita income of each State. The law requires that Federal funds accepted must be matched equally by funds from sources within the States, except where the State's per capita income is lower than the average for the United States.

The portion of the appropriation not allocated to States and Territories, aside from funds needed for administrative expenses, is available to the Department of Agriculture for the purchase and distribution of specific foods to schools participating in the program, but fishery products are not included in this phase of the program. For 1949-50, $17,250,000 has been earmarked for purchases of this type.

The Fish and Wildlife Service is stimulating the use of fish and shellfish through

fish cookery demonstrations and procurement assistance by fishery marketing specialists. Dealers in fishery products should contact local school lunch agencies in their area and attempt to sell these outlets quality fishery products.

Scientific Conference On Conservation And Utilization Of Resources 1/

About 400 scientists and delegates (200 United States experts and 200 delegates from other Member Nations of the United Nations) from 41 different countries attended the United Nations Scientific Conference on the Conservation and Utilization of Resources (UNSCCUR) authorized by the Economic and Social Council and held at Interim Headquarters of the United Nations at Lake Success, New York, from August 17 to September 6, 1949. The Conference was devoted to an exchange of ideas and experiences on techniques of resource conservation and utilization, their economic costs and benefits and their interrelations. Included among the six general subjects discussed was wildlife, fish and marine resources. The Conference had no policy-making responsibilities and it did not bind governments or formulate recommendations to them.

Discussions at the UNSCCUR included ways and means of producing and marketing fish to feed populations of the world; causes for the material fluctuation in the abundance of marine fish; effects of commercial fishing upon fish resources of the ocean; methods of exploring and developing new fishing grounds; practical economics of marine fish from the standpoint of selection of craft and gear, type of catches, and marketing; augmenting of the food supply through pond culture of warm-water fish; and management of fish life in the lakes and streams of the world.

The discussions on the general subject of wildlife, fish and marine resources included the following general groupings for fish and marine resources:

1. Changes in Abundance of Fish Populations:
   - (a) The effects of natural conditions. (Natural fluctuations in the abundance of marine fishes and their probable causes such as poor survival of young, unfavorable hydrological conditions, food supply, population pressures, excessive natural mortalities.)
   - (b) The effects of fishing. (Reaction of fish stocks to fishing; evidences of overfishing; species most susceptible to overfishing; the optimum catch.)
2. Developing Fishery Resources:
   - (a) Latent fishery resources and means for their development. (Location of undeveloped fisheries, methods of exploration and development; evidence of the existence of oceanic stocks; potential contribution to world food supply; international cooperation in exploitation.)
   - (b) Propagation and transplantation of marine fish. (Possibilities of hatching, stocking and transplanting; methods employed.)
3. Fisheries Statistics:
   - (a) Statistics on economic features. (Craft and gear used; catches; price, cost of production; marketing; development of fisheries; organization of industry; domestic and foreign trade.)
   - (b) Biological statistics. (Resource evaluation; catch per unit of effort; measurements of fish at markets; statistical treatment of biological data.)
4. Management and Cultivation of Fresh Water Fish:
   - (a) Pond culture of warm-water fishes. (Role of pond culture in food production, pond management; selection of species, pond fertilization, stocking, cropping; potential possibilities of pond culture as an additional source of food.)
   - (b) Management of cold-water fish resources. (Principles and practices of hatching, stocking and management in streams, lakes, and artificial impoundments; carrying capacity of waters; population balance; introduction of exotic species; effects of various rates of cropping on production; regulation of fishing.)
5. Technological Development in Fisheries:

   Recent advances in methods of handling, distribution, preservation and processing of fish; new products and byproducts. Also notes on the factory ship, echo ranging and echo sounding and aerial detection of fish, navigation aids, etc.
6. Research in the Conservation and Utilization of Marine Resources:

1/ See Commercial Fisheries Review, April 1949, pp. 30-2.

(a) Research in fishery conservation. (Techniques used in studying fisheries; the integration of hydrological, biological, and other studies in a well-rounded marine fisheries research program.)

(b) Utilization of algae. (Location and composition of algae of actual or potential value; quantitative survey methods and findings; growing, harvesting and processing techniques and equipment; food, industrial and agricultural utilization of algae and algal chemicals; seaweed conservation.)

The following papers were presented at the Conference and these will be published as part of the printed proceedings which will be available in the near future.

Changes in the Abundance of Fish Populations, by Gunnar Rollefsen, Director, Biological Station, Bergen, Norway. (Introductory Paper.) Abstract: The variable nature of Norway's seasonal fishing for cod and herring is outlined. Reasons are given why the great fluctuations in the catches hitherto must be considered caused by other activity than that of man. Different types of fluctuations occurring are described and analyzed. 1(a)/1

Fluctuations in the Abundance of Herring on the West Coast of Vancouver Island, British Columbia, by Albert L. Tester, Fisheries Research Board of Canada and University of Hawaii, Honolulu, T. H. (Experience Paper.) 1(a)/2

The Present World Problem of Sea Fisheries, by Jean Le Gall, Agrege, Director of the Office of Scientifique et Technique des Peches Maritimes, France. (Experience Paper.) 1(a)/3

Fluctuations in Fish Populations Owing to Climatic Changes, by A. Vedel Tåning, D. Sc., Charlottenlund, Denmark. (Experience Paper.) 1(a)/4

The Enclosing of the Zuyder Zee and Its Effect on Fisheries, by Dr. B. Havinga, Director, Government Institute for Fisheries Investigations, Amsterdam, The Netherlands. (Experience Paper.) 1(a)

Overfishing, by Dr. Michael Graham, Lowestoft Research Laboratory of the Ministry of Agriculture and Fisheries, Norfolk, England. (Introductory Paper.) 1(b)/1

The Effects of Fishing on Norwegian Fresh-water and Anadromous Fishes, by Sven Somme, Government Inspector of Salmon and Fresh-water Fisheries, Oslo, Norway. (Experience Paper.) 1(b)/2

Latent Fishery Resources and Means for Their Development, by Dr. Harold Thompson, M. A., D. Sc., Chief, Division of Fisheries, C. S. I. R., Marine Biological Laboratory, Cronulla, New South Wales, Australia. (Introductory Paper.) 2(a)/1

Latent Fishery Resources and Means for Their Development, by Dr. Cecil Von Bonde, Director of Fisheries for the Government of the Union of South Africa and Member of the Standing Advisory Committee on Fisheries of FAO, Capetown, Union of South Africa. (Experience Paper.) 2(a)/2

Latent Fishery Resources and Means for Their Development, by Prof. Dr. E. de Vries and Dr. C. J. Bottemanne, The Netherlands. (Experience Paper.) 2(a)/3

The Exploitation of the Egyptian Elasmobranches, by Dr. Ibrahim Abou Samra, Director of Fouad Institute of Hydrobiology and Fisheries, Alexandria, Egypt. (Experience Paper.) 2(a)/4

The Shellfish Industry in Holland, by Dr. P. Korringa, Government Institute for Fishery Investigations, Bergen op Zoom, The Netherlands. (Experience Paper.) 2(a)/5

The Development of the Fishery Resources in Chile, by Milton J. Lobell, Santiago, Chile. (Experience Paper.) 2(a)/6

Propagation and Transplantation of Marine Fish, by H. Blegvad, Ph. D., Director, Danish Biological Station, Secretary-General, International Council for the Exploration of the Sea, Charlottenlund, Denmark. (Introductory Paper.) 2(b)/1

Propagation and Transplantation of Marine Fish in Europe, by Dr. Alf Dannevig, The Flødevig Seafish Hatchery, Arendal, Norway. (Experience Paper.) 2(b)/2

Statistics on Economic Features of the Fisheries, by Stewart Bates, Deputy Minister of Fisheries, Ottawa, Canada. (Introductory Paper.) 3(a)/1

Economic Statistics on Marine Fisheries, by M. Louis, Principal Administrator of the Inscription Maritime, Marine Fisheries Department, Merchant Marine, France. (Experience Paper.) 3(a)/2

Fisheries Statistics - Data Submitted by the Netherlands Government. 3(a)/4

Statistics on Economic Features of the Fisheries, by G. M. Gerhardsen, Chief Economist, Fisheries Division, Food and Agriculture Organization of the United Nations, Washington, D. C., U. S. A. (Experience Paper.) 3(a)/4

Statistics on Economic Features of the Fisheries of the United States, by Edward A. Power, Chief, Statistical Section, Branch of Commercial Fisheries, Fish and Wildlife Service, U. S. Department of the Interior, Washington, D. C. (Experience Paper.) Abstract: The collection of basic employment and production statistics in the United States is considered a State rather than a Federal function. However, only about one-half of the States supporting important commercial fisheries collect detailed fishery statistics.

Establishment of statistical systems by slow degrees is recommended. Once a statistical system is established, it is essential that use be made of the figures, or the quality of the data will decrease.

Experience appears to indicate that, in the United States, it is more profitable to confine the limited Federal collection of data to areas where the maximum cooperation with other agencies is obtained.

Special manufactured products surveys can be used to obtain some knowledge of catch trends.

The collection and publication of daily fishery production, price and movement statistics is one of the most valuable services provided the fishing industry. Despite the improvement in the collection and dissemination of fishery data in the United States, economists are still handicapped by the lack of essential data.

The River and Inland Fishery, the Fish Stock and Fish Rearing in the Netherlands, by C. D. C. Hos, The Netherlands. (Experience Paper.) 4(a)/8

Management and Cultivation of Fresh Water Fish: Pond Culture of Warm Water Fishes, by Sunder Lal Hora, D. Sc., F. R. S. E., F. Z. S., F. R. A. S. B., F. N. I., Director, Zoological Survey of India, Indian Museum, Calcutta, India. (Introductory Paper.) 4(a)/1

Rice-Paddy Carp Culture in Japan, by Yoshio Hiyama, Fisheries Institute, Faculty of Agriculture, Tokyo University, Tokyo, Japan. (Experience Paper.) 4(a)/2

Pond Culture of Warm Water Fishes, by S. Y. Lin, Fisheries Research Department, Hong Kong, China. (Experience Paper.) 4(a)/4

Pond Culture of Warm-Water Fishes in Indonesia, by Ir. A. F. Hofstede, Head of the Sub-section Inland Fisheries, Department of Agriculture and Fisheries, Batavia, Indonesia. (Experience Paper.) 4(a)/5

Pond Culture of Warm-Water Fishes as Related to Soil Conservation, by O. Lloyd Meehean, Fish and Wildlife Service, U. S. Department of the Interior, Washington, D. C. (Experience Paper.) 4(a)/6

Pond Culture of Warm Water Fishes (With Special Reference to Bangos or Milkfish Cultivation Under Philippine Conditions), by Herminio R. Rabanal, Bureau of Fisheries, Department of Agriculture and Natural Resources, Manila, Philippines. (Experience Paper.) 4(a)/7

Management and Cultivation of Fresh-Water Fish - Principles and Practices with Special Reference to Conditions in New Zealand, by A. K. Hefford, formerly Chief Inspector of Fisheries and Director of Fishery Research to the Marine Department, New Zealand. (Introductory Paper.) 4(b)/1

The Management of Cold-Water Fish Resources in South Africa, by D. Hey, B. Sc., Department of Inland Fisheries, Cape Provincial Administration, Stellenbosch, South Africa. (Experience Paper.) 4(b)/2

Recent Advances in Methods of Handling, Preservation, Processing and Distribution of Fish. Developments in Utilization, New Products and By-Products, by Olav Hoteverp, Director, Norwegian Fisheries, Official Research Laboratory, Bergen, Norway. (Introductory Paper.) 5/1

Recent Advances in the Handling and Processing of Fish, by C. A. Reay, M. Sc., Ph. D., F. R. I. C., Department of Scientific and Industrial Research, Torry Research Station, Aberdeen, Scotland. (Experience Paper.) 5/2

Recent Advances in Various Technological Aspects of Handling Fish and Fish Products, by Dr. H. L. A. Tarr, Acting Director, Fisheries Research Board of Canada, Fisheries Experimental Station, Vancouver, B. C., Canada. (Experience Paper.) 5/3

Technological Advances in Fishing Methods, by Dr. J. L. Hart, Pacific Biological Station, Nanaimo, B. C., Canada. (Experience Paper.) Abstract: High speed diesel engines, radio telephone, and echo-sounding are of established general usefulness in many fisheries. Bunge finders and automatic pilots have proved of definite value in particular fisheries. Aerial detection of fish and the use of echo ranging have been the subject of encouraging experiment and may have unrealised potentialities in increasing fishing efficiency. 5/4

Saury Lift-Net Fishing with Light, by Shigeno Takayama, Central Fisheries Station of Japan, Tokyo. (Experience Paper.) 5/5

Technological Development in Fisheries with Special Reference to the Factory Ship in the United States, by A. W. Anderson, Chief, Branch of Commercial Fisheries, Fish and Wildlife Service, Department of the Interior, Washington, D. C. (Experience Paper.) Abstract: Mobile vessels processing their own catches or the catches of an accompanying fleet of fishing craft have operated in the United States fisheries since early in the 16th Century beginning with salting cod and progressing through whaling, salmon canning; freezing tuna, halibut and salmon; and reducing pilchards, herring and waste to meal and oil.

Recent factory ship developments have been varied. The Atlantic Coast fisheries are represented only by a proposed 175-foot vessel equipped to trawl, fillet and freeze its catch, and reduce the waste. Gulf of Mexico fishery interests have built or adapted a number of shrimp trawlers to catch, package and freeze shrimp but current operations appear unprofitable.

Western Alaska fisheries have attracted an increasing number of vessels equipped to dress, freeze and transport salmon. The king crab resources also are being fished by additional craft specially built or converted to trawl for king crab, and package and freeze crab meat.

The operations of the Pacific Explorer, 8800-ton factory ship, in serving as a mothership and freezer for tuna purse seiners resulted in a series of smaller but more adaptable tuna freezing and transporting vessels for use in waters off Central and South America. The Pacific Explorer operation in Western Alaska produced a large pack of canned king crab but the advantages of a factory ship of its type have yet to be compared in detail with other types of operation.

Filleting is not being practised on fishing craft but tests indicate that freezing round fish at sea, thawing and filleting them on shore, and packaging and refreezing the fillets may have many advantages. 5/6

Recent Advances in Methods of Handling, Preservation, Processing, and Distribution of Fish. Developments in Utilization, New Products and By-Products, by Frode Braasnoes, Director of the Technological Laboratory of the Ministry of Fisheries, Denmark. (Experience Paper.) 5/9

The French Sea Fishing By-Products Industry, by Prof. J. Perard, Chairman of the Syndicat General des Industries de traitement des sous-produits de la peche maritime, Paris, France. (Experience Paper.) 5/7

Methods of Detecting Fish by Echo Ranging and Echo Sounding, by Lieutenant de vaisseau J. Renou, Head of the "Press-Information" Service of the French Navy. (Experience Paper.) Abstract: Numerous experiments have definitely established that an echo-ranging device, whatever it may be, can detect any shoal of fish whatsoever at distances varying from 200 to 2,000 meters, provided that the conditions of propagation in the water are not extremely unfavorable; with the indications furnished by an echo-ranging device, a fishing boat equipped with that apparatus can be guided directly to the shoal, the depth of which is then revealed by the echo-sounding instrument; taking into account the echological factors, the detected fish can be identified in most cases by studying the echo-ranging and echo-sounding recordings. Echo-ranging can therefore be an effective aid to fishing. Aerial detection can also render valuable assistance, though in exceptional cases only, either when the water is transparent enough to allow the fish to be seen at a depth of several meters or when the shoal of fish comes to the surface to disport itself or to escape. The experiments, methods of investigation, results obtained, practical conclusions and future prospects are summarized in this paper. 5/8

Changes in the North Sea Stocks of Fish, by Michael Graham, Lowestoft Research Laboratory of the Ministry of Agriculture and Fisheries, Suffolk, England. (Experience Paper.) 6(a)/2

Research on Use and Increase of Fish Stocks, by Dr. A. G. Huntsman, Editor of Publications and Consulting Director, University of Toronto, Toronto, Ontario, Canada. (Experience Paper.) 6(a)/3

Research in Fishery Conservation (Techniques Used in Studying Fisheries; The Integration of Hydrological and Biological and Other Studies in a Well-Rounded Marine Fisheries Research Programme in India), by H. Srinivasa Rao, Chief Research Officer, Central Marine Fisheries Research Station, Madras, India. (Experience Paper.) 6(a)/4

The Utilization of Marine Algae, by Major Philip Jackson, M. Mech. E., M. Chemist. F., Deputy Director of the Scottish Seaweed Research Association, Midlothian, Scotland. (Experience Paper.) 6(b)/2

Utilization of Algae, by Emil Oy, Chemical Engineer, Stavanger, Norway. (Experience Paper.) 6(b)/3

Marine Algae, by Mr. Schang, Vice-President of the National Union of Iodine Manufacturers, Paris, France. (Experience Paper.) 6(b)/4

Sea Lampreys Continue to Increase in Great Lakes

Destruction of the Great Lakes fishing industry (the nation's richest source of fresh water fish for commerce and recreation) is threatened unless an effective control of the sea lamprey is developed within the next few years, according to the Director of the Fish and Wildlife Service.

In a report to Secretary of the Interior, the Director said that the lamprey is continuing to increase at an alarming rate, and already Lake Huron trout, hardest hit by the attack, has practically disappeared from the commercial catch. The total United States and Canadian commercial production of fish from the Great Lakes is around 100 million pounds annually. More than 5,000 U. S. fishermen and 2,000 boats are normally engaged in the industry.

The sea lamprey is an eel-shaped parasite with a suction-cup mouth, which sucks the blood of lake fishes, leaving them either dead or so badly scarred that it is almost impossible for commercial fishermen to dispose of them.

The sea lamprey problem was first brought before Congress in a hearing held in Washington in June 1946. Concerned over the threat to the $12 million a year Great Lakes fishing industry, Congress passed Public Law 672 to engage in a program for the control of the lamprey, in conjunction with bordering States and other cooperators.

A Great Lakes Sea Lamprey Committee was formed, consisting of representatives from Wisconsin, Minnesota, Pennsylvania, Indiana, Illinois, Ohio, New York, the Province of Ontario, and the U. S. Fish and Wildlife Service. This international committee drew up a research program and field investigations were started.

From 1895 to 1935 lake trout production was quite steady in the United States waters of Lake Huron, averaging 1,720,000 pounds per year. From 1936 to 1939 the yield dropped to 1,345,000 pounds. In 1940 the take fell below 1,000,000 pounds and continued to fall in each succeeding year until it reached a new record low in 1948 of less than 5,000 pounds. A similar fate befell lake trout in the Canadian waters of Huron. No known factor other than sea lamprey depredations can account for this complete collapse of this fishery.

Lake Michigan trout is facing the same situation. From 1879 to 1945 the average annual take was somewhat over 6 million pounds. In 1946 it dropped to less than 4 million, in 1947 to less than 2½ million, and in 1948 to a little more than 1 million pounds, or one-sixth of the normal catch.

In Lake Superior the trout yield has not yet been noticeably affected by the lamprey but biologists predict that unless the parasite can be controlled, Superior trout will face extermination in a few years.

Now that the lake trout is so reduced in abundance, the sea lamprey is beginning to attack other species of fish, such as the whitefish, walleyes, herring, chubs, black bass, suckers, perch, bullheads, and catfish. This shifting of hosts by the parasite is unfortunate, say Service biologists, for not only do the sea lampreys divert their attacks to other species but fishermen must likewise change their fishing habits. In Lake Michigan, gill-net fishermen who formerly set nets for trout must now fish almost entirely for chubs and whitefish. These diverted attacks by both sea lampreys and fishermen place a heavy drain on all of the more valuable Great Lakes species of fish and threaten the existence of the entire industry.

So far no satisfactory solution has yet been found to the problem of control. Weirs and traps were found to be effective in certain streams, but such methods are expensive, are slow in exterminating a run, and are generally not applicable in many of the streams where spawning lampreys enter. At the present it appears that a combination of methods must be employed to eradicate or control the pest in most streams, and efforts must be concentrated on major runs. Certain fundamental questions have already been answered by research men but others must await further investigations.

During the 1949 season the spawning run of lampreys trapped by a two-way weir on the Ocqueoc River in Northern Michigan amounted to nearly 25,000 on July 18, when the run was largely completed. This is twice the 1948 estimate and two and one-half times the 1947 estimate.

The Ocqueoc weir was constructed by the Service in 1947 to trap adult lampreys on their upstream spawning migration and young lampreys on their way to Lake Huron to begin the parasitic phase of their life. It is operated by personnel of the Michigan Department of Conservation.

Evidence of how rapidly the sea lamprey is spreading is contained in numerous reports received by the Service. The presence of mature or spawning sea lampreys has been verified in 92 streams in Michigan, and reliably reported in 18 others. Lampreys have also become established in two inland lakes, Burt and Mullet, and were present in Lake Charlevoix and Pentwater Lake.

A similar situation exists on the Wisconsin shore of Lake Michigan. Reports received by the Service from the Wisconsin Conservation Department, which operates a weir on Hibbard Creek (Door Peninsula), reveal that lampreys are on the increase there. In the Kewaunee and Michicott Rivers, the 1949 runs were extremely large although neither river had previously had an important run.

A considerable number of lampreys have invaded Indiana streams, the Service has been advised, sizeable run having entered the Little Calumet River in late May.

Commercial fishermen report that the lampreys are becoming more abundant in both Lake Huron and Lake Michigan. "Unprecedented concentrations" were observed in northwestern Lake Huron and the Straits of Mackinac in the fall of 1948.

On the Wisconsin shore of Lake Michigan, gill-net fishing for lake trout has been almost entirely abandoned and the catches of trout in pound nets are only a small fraction of those of former years.

The lamprey is not native to the upper four Great Lakes. Stocks now found in these waters are undoubtedly the progeny of lampreys that passed through the Welland Canal into Lake Erie where they were reported off Merlin, Ontario, in 1921, and at Sandusky, Ohio, in 1927. The lamprey reached the St. Clair River by 1930 and was in Lake Michigan off Milwaukee by 1936. In 1937 a large spawning run was observed in the Ocqueoc River. The first specimens from the U. S. waters of Lake Superior were reported from the western end of 1946. Now present in all of the Great Lakes, the parasite is most abundant in Huron, Michigan, and Ontario where it is found down to depths as great as 65 fathoms.

It has been discovered that sea lampreys cannot be utilized for the market. Preliminary analyses indicate that both their vitamin A potency and oil yield are much too low for commercial exploitation. It is possible that some lampreys can

be used for reduction purposes. A small quantity can be sold to biological supply houses. Cooking tests failed because of the soft body of the lamprey and its extreme susceptibility to fungus infection. A Canadian canning test, however, has shown some promise of success.

Sealskin Prices Decline at Fall Fur Auction

A good attendance of buyers marked the fall auction of the Fouke Fur Company in St. Louis at which 25,100 Government-owned fur-seal skins from the Pribilof Islands were sold for $1,420,260, the Service announced on October 13. The auction, held Monday, October 10, also included South African and Canadian fur-seal skins.

The grand average for all skins was $55.93, which showed a decline from the spring fur-sale of 5.7 percent. The marked trend in preference for darker shades of fur was continued. Black sealskins showed an advance of 10.9 percent, averaging $68.53 each. Although the darker shades of matara advanced, lighter shades declined. The all matara average declined 11.1 percent; the average price for matara being $55.52. Safari brown (the lighter skins) declined 5.1 percent, for an average of $46.81.

The same company also sold 309 Government-owned blue-fox skins taken by the Pribilof Island natives. These averaged $4.51, for a total of $1,393.75.

The 1,625 Canadian government-owned matara brown sealskins sold at the auction for essentially the same prices commanded by the United States skins. South African Cape of Good Hope skins averaged $23.62, showing a decline of 10.8 percent. The Government of the Union of South Africa offered 2,500 skins, and private shippers offered an additional 2,700 Cape of Good Hope sealskins.

Wholesale and Retail Prices

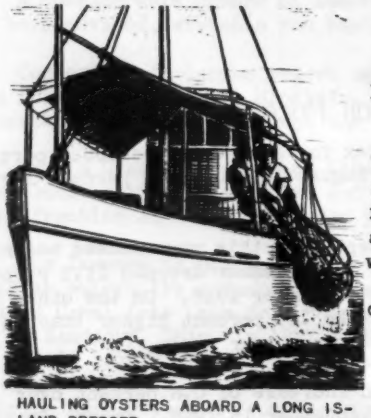
On September 13 this year the wholesale index for all foods was 166.3 percent of the 1926 average, 3.3 percent higher than on August 16, but 12.3 percent lower than on September 14 a year ago.

Wholesale prices for canned salmon during September this year showed weakness compared with August. Canned pink salmon prices in September dropped 11.5 percent under August and were 27.4 percent lower than in September 1948. On the other hand, canned red salmon prices during the month were 2.5 percent higher than in August, but still 7.4 percent lower than in September a year ago.

Retail food prices on September 15 showed an increase of 0.8 percent over August 15 this year, but were 5.1 percent below September 15,1948. Fresh, frozen and canned fishery prices followed the same general trend and on September 15 were 1 percent higher than in mid-August, but 1 percent below mid-September 1948. This is the first time in more than a year that this index dropped below the corresponding period a year ago, and was due mainly to a weakening in canned fish prices. In mid-September, the fresh and frozen fishery products index was 2.2 percent higher than mid-August this year, but 1.5 percent below September 15, 1948. Retail

Wholesale and Retail Prices				
Item	Unit		Percentage change from--	
Wholesale: (1926 = 100)		Sept.13,1949	Aug.16,1949	Sept.14,1948
All commodities	Index No.	154.6	+1.8	- 9.0
Foods	do	166.3	+3.3	-12.3
Fish:		Sept. 1949	Aug. 1949	Sept. 1948
Canned salmon, Seattle:				
Pink, No. 1, Tall	$ per doz. cans	4.2478	-11.5	-27.4
Red, No. 1, Tall	do	6.1562	+ 2.5	- 7.4
Cod, cured, large shore, Gloucester, Mass.	$ per 100 lbs.	15.500	0	+ 3.33
Retail: (1935-39 = 100)		Sept.15,1949	Aug.15,1949	Sept.15,1948
All foods	Index No.	204.2	+0.8	- 5.1
Fish:				
Fresh, frozen and canned	do	311.9	+1.0	- 1.0
Fresh and frozen	do	260.1	+2.2	- 1.5
Canned salmon:				
Pink	¢ per lb. can	56.2	-1.2	- 0.1

prices for canned pink salmon continued to decline and were 1.2 percent lower on September 15 compared to the previous month, and 0.1 percent lower than mid-September 1948. This is also the first time in over a year that pink salmon retail prices have gone below the corresponding period a year ago.



HAULING OYSTERS ABOARD A LONG ISLAND DREDGER.

OUR OYSTER INDUSTRY

DO YOU KNOW .....

That practically all oysters are taken by fishermen using tongs or dredges; tongs are long scissor-shaped tools from 12 to 18 feet long with iron baskets fitting together at the tips, and can be used only in shallow water; dredges are rake-like devices to which are attached a bag (generally of chain) to catch the oysters loosened from the bottom as it is dragged at the end of a tow line ....

Australia

NEW FISHERIES DEVELOPMENTS: Canning: Barracuda taken by Victoria, Australia, fishermen are being sent to canneries in New South Wales and Tasmania. A cannery in Melbourne also has been processing this species, according to the June 1949 Fisheries Newsletter of the Australian Director of Fisheries.

If a cannery demand for pilchards can be developed, experiments already carried out in Victoria with various types of pelagic fishery nets indicate that appreciable quantities of these fish can be taken. A new fish cannery at Busselton in Western Australia went into operation on May 2.

Trawling: Two companies, each of which proposes to obtain a steam trawler with an experienced crew from England to fish along the southern coast of Western Australia, are being formed. The Government of Western Australia is deeply impressed with the trawling possibilities in waters off the southern part of the State, and as good markets are available, the ventures are receiving the full support of the Commonwealth Director of Fisheries and the Department of Industrial Development.

Crayfish Industry: The crayfish industry of Western Australia has been greatly expanded since the war, with landings reaching 2,750,000 pounds in 1948. It is intended to use a new and larger patrol vessel at a later date for investigation of new crayfish areas and to test out various types of small-boat fishing gear.

In 1947, successful trial shipments of 97,000 pounds of frozen crayfish tails arrived in United States ports from Australia. In 1948, imports by the United States ports of 514,290 pounds of frozen crayfish tails helped to eliminate gluts in Australian markets and to stabilize prices.

Imports of Australian frozen crayfish tails by the United States during the first quarter of 1949 amounted to 423,385 pounds as compared with 195,251 pounds in the like period of 1948.

Bizone Germany

OPERATION OF AMERICAN TRAWLERS: The first (the U.S.A. Surf) of the 12 motor trawlers purchased by the U. S. Army for use in German fisheries, completed its second trip to the North Sea herring grounds on August 25, bringing a full cargo of 130 metric tons of herring after a voyage of only 9 days, according to an August 30 report from the American Consulate at Bremerhaven. The German firm char-

tering the vessel from the "Fischdampfer Treuhand" is satisfied with its performance, which not only exceeded expectations but also exceeded the performance of several German steam trawlers operating in the same area. The success of the Surf is ascribed locally to its ability to pull the net more steadily and quickly than the average small steam trawler. This success has caused some of the firms, which applied unsuccessfully for one of the 12 trawlers, to try to get more aid funds allocated for the purchase of fishing vessels so that they might get a trawler under charter terms.

Although local fisheries circles are beginning to look upon the trawlers as a valuable addition to the German fleet, no German company has shown any desire to buy one of the twelve at the price paid by the U. S. Army in the United States. The Surf, for example, was valued by a German source at $195,000, or less than 70 percent of its cost in the United States. Many Germans still believe that the Army would have been better advised to have had new fishing craft built in Germany with the money that was spent in buying and repairing the twelve used trawlers.

NOTE: Values converted on the basis of 1 Deutsche mark equals 30 cents U. S.

Canada

DRAGGING PROFITABLE IN WESTERN NOVA SCOTIA: Exploratory dragging for flounders in inshore waters by the Atlantic Biological Station of the Fisheries Research Board of Canada, at St. Andrews, N. B., has stimulated the development of a fleet of inshore commercial draggers in western Nova Scotia, according to the August 1949 Trade News of the Canadian Fisheries Department.

MAP SHOWS AREAS WHERE EXPLORATORY FLOUNDER FISHING WAS CONDUCTED.

Successful experimental dragging operations were conducted in 1948 in St. Mary Bay on the western coast of Nova Scotia, and in the spring of this year, the exploratory fishing was extended to the north shore of the Bay of Fundy, Scotts Bay, and Minas Basin.

The report on exploratory fishing states that an extensive area of smooth bottom and good fishing was found in Minas Basin off Kingsport and north to Cape Blomidon.

The winter flounders (about 14 inches) proved to be fast-growing fish. Fishing was comparable with that found in St. Mary Bay and Annapolis Basin and there were also suggestions of good haddock fishing.

St. Mary Bay fishermen are interested in the potentialities of this flounder resource as a means of supplementing a fishery which has been restricted both by variety and by seasons. Seven Cape Island boats, locally owned and operated, had rigged for dragging in St. Mary Bay by June of this year. A similar realization of the fishing potentialities of Minas Basin by fishermen of that area may be expected and the use of small draggers by them is anticipated as markets are developed.

The exploratory fishing, conducted from the research boat Pandalus, has already resulted in an extension of commercial dragging to Minas Basin. A comparison of the results of commercial dragging for flounders and haddock on these grounds, during one month following this discovery, with the average annual production of Kings County, N. S., is of interest. One ex-scallop dragger operating one month this year in Minas Basin made a catch of 76,000 pounds of winter flounder and 19,000 pounds of haddock. There was no catch of winter flounder in Kings County from 1937-46, while the average annual catch of haddock for the same period was 7,420 pounds.

Costa Rica

MAY CHANGE CURRENT FISHERY LEGISLATION: Interested Costa Rican government departments have been in consultation among themselves and with representatives of the fishing industry regarding proposed changes in current legislation concerning that industry, according to a September 26 report from the American Embassy at San Jose.

The press has pointed out that decrees issued in the early part of this year have been detrimental to the local fishing industry, and that changes will be made in fishing regulations and the tax structure for the industry, but there has been no official confirmation of those statements.

Cuba

FISHING VESSELS EQUIPPED WITH DEPTH RECORDERS: The Cuban Government on August 31, 1949, delivered 60 supersonic depth recorders, manufactured in the United States, to the same number of privately owned fishing vessels which usually fish off the Mexican coast, according to a September 16 report from the American Embassy at Havana. Money for these recorders ($186,500) was voted May 1948 by the Cuban Government.

With these recorders, fishing vessels hope to save eight to ten days per voyage in locating schools of fish and to increase their catch by two-fifths.

Denmark

DANISH FISHING GROUNDS STOCKED WITH PLAICE FRY: The decline in catches of plaice in the traditional Danish fishing grounds of the Kattegat, the Limfjord, and the North Sea during recent years has given rise to a program of systematic planting of plaice fry in these waters, according to a September 22 report from the American Embassy at Copenhagen. Experiments so far conducted by the Danish Government in close cooperation with the fishery trade have shown encouraging results, and the program will be expanded in the future.

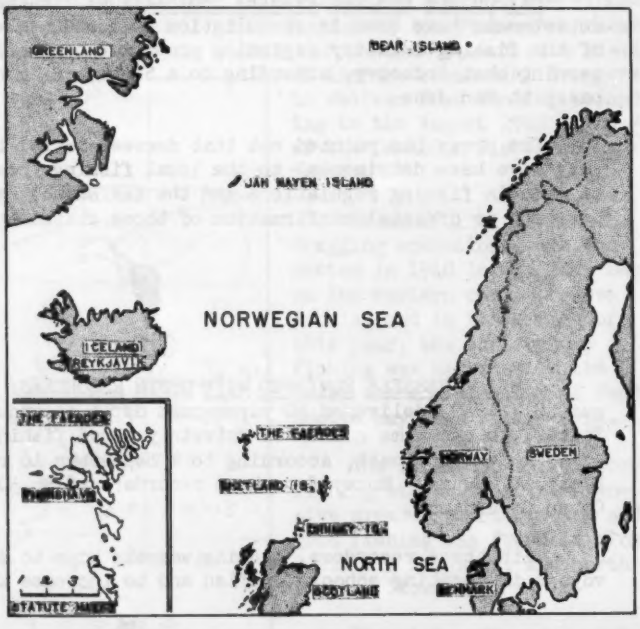
According to present plans, 5 million fry will be planted in these areas during March and April 1950.

The Danes would like to interest the British in the North Sea planting project, but to date, British authorities have refused to participate since it has been shown by past experiments that from 80 to 90 percent of the plaice caught in the North Sea is landed by Danish fishing vessels.

* * * * *

FISHERIES OF THE FAEROE ISLANDS, 1948: Production: The production of the fisheries of the Faeroe Islands (Danish island group north of the British Isles) is obtained partly on fishing grounds near the Islands and partly on fishing grounds near Iceland, Greenland, the north coast of Norway, and Bear Island, according to the August 1949 issue of Konserves.

The fishermen fishing near the Islands are able to land fish suitable for producing frozen fish fillets and canned fish. The production from far-off fishing grounds is landed directly in a foreign port as iced fish, or salted on board and further treated when landed in the Islands. Only one schooner is equipped with freezing facilities at present.



Processing: The fish caught near the Islands, which are not consumed locally or exported as iced fish, are salted or canned. There is still only one cannery and it packs, among other items, fish balls, cod roe, and Norway lobster. The first plant for the production of frozen fish fillets is being built.

Formerly, a large amount of the salted fish landed in the Islands was dried. This industry, however, has declined considerably during the last few years since the prices for salted fish have been high.

Fishing Fleet: In the last few years, the importance of trawlers for fishing further offshore has been recognized, and there are now 38 trawlers in operation. In 1948, some of these vessels were successfully fishing near Greenland.

Exports: In 1948, the Islands exported 25,421 metric tons of fresh fish, 34,277 tons of wet salted fish, 358 tons of salted dried fish, and 2,000 tons of cod liver oil.

Whaling: Whaling takes place from two land stations, and the total catch in 1948 was 271 whales. The products exported consisted of 420 metric tons of frozen whale meat, 230 tons of whale meal, and 1,500 tons of whale oil.

* * * * *

USE ELECTRIFIED TUNA LINES: A Danish fisherman has begun to use electricity in the catching of bluefin tuna, according to Fiskaren, a Norwegian periodical. A hook is fastened to a wire which serves both to carry the current and as a catching line. The wire is coupled to a dynamo aboard the cutter. When a tuna bites he presses a button which completes the circuit and electrifies the line until the tuna is brought on board.

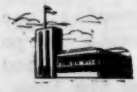
Greenland

FISHING SEASON, 1949: Danish and foreign fishing off the coast of Greenland has continued to expand during the summer of 1949. In addition to the Danish, Norwegian, and Faeroese vessels, which have been fishing off this coast for many years, Portuguese participation is increasing, according to an August 16 report from the American Consulate at Godthaab.

A Danish company which operates from Torkussak had caught 100 metric tons of fish by the end of June. Another firm also operating out of Torkussak expects a total catch of 1,000 metric tons this year. A freezing plant was completed at Torkussak last year.

In Faeringhavn there are about 35 large Norwegian and Faeroese fishing craft which are all connected with a Danish-Norwegian firm. They arrived early in June and by early July had made their first shipment of 850 metric tons. The physical installation at Faeringhavn has been expanded by several buildings this year.

The Greenland Administration is continuing its efforts to increase the participation of the local population in these fisheries. Freezing and canning plants are going to be constructed in Narsak and Egedesminde, Greenland.



Guatemala

LIMITS OF TERRITORIAL WATERS: The Guatemalan laws, decrees, regulations, treaties and other Government pronouncements concerning the delimitation and measurement of inland waters and marginal seas of Guatemala are contained in,

(1) Decree No. 2393 of June 17, 1940;

(2) Regulations for the Government and Police of the Ports of the Republic of May 22, 1939; and

(3) The Civil Code of the Republic of Guatemala with amendments and changes made prior to 1944,

according to a September 2 American consular report.

Pertinent provisions of these documents are:

1. The territorial waters of the Republic of Guatemala are those which lie within 12 miles of the coast, counting from low tide or from the most salient point on the coast. The meaning here is obscure and the wording of Decree No. 2393 is not precisely the same as that found in the Regulations for the Government and Police of the Ports. Whether "the most salient point" is intended to mean low tide, or whether low tide at the most salient point on the coast is intended to be the point from which the 12 miles measurement should begin, is not clear.

2. The Bay of Amatique, commonly known as the Bay of Puerto Barrios, is specifically declared to be territorial waters of the Republic of Guatemala by Decree No. 2393.

3. Inland waterways, lakes and ponds are the property of the Nation under certain conditions. However, the Nation reserves as a zone for public use a strip of land 1,500 meters wide, counting from high tide, along the entire sea coast frontier of the Republic; a strip 200 meters wide around the shores of lakes; a strip 100 meters wide on each bank of navigable rivers; and a 10 meter strip around or on either side of springs and fountains which serve as a water supply for cities and villages.

Iceland

GUARANTEED PRICES ON EXPORTED FISH: A special committee, the "Fiskabyrgdarnefnd" (Fish Guarantee Committee), annually reviews the previous year's Icelandic Government guaranteed price list and establishes the prices to be paid to the exporters of frozen fillets and salted fish, according to a July 22 report from the American Legation at Reykjavik. Subsequently, the Minister of Fisheries reviews the Committee's price regulations, which go into effect on January 1 and expire on December 31 of each year.

In accordance with the Anti-Inflation Law effective January 1, 1949, the price paid to the fishermen for fresh fish delivered to the processing plants is $4.54 per cwt. with heads on; $5.90 per cwt. with heads off; and $3.14 per cwt. for rock salmon (catfish) with heads on. The catches consist chiefly of cod and haddock. The export prices are based on guaranteed prices paid to fishermen and on the costs of production, such as filleting, freezing, packing, and storage. The basic Government guaranteed export price is 20.4 cents per pound f.o.b. for fillets (principally cod) and 15.72 cents per pounds f.o.b. for salted fish. The price of other fish, frozen or salted for export, depends upon the type of packing and the species of fish. There is no guaranteed price on frozen fish packed in cellophane, which is mainly exported to the United States and Switzerland. Prices, however, are subject to change as conditions warrant modification.

In 1948, the Government paid out of the National Treasury approximately $3,228,286 to subsidize the export of frozen fillets and salted fish. Under a trade agreement, Iceland will export to the United Kingdom approximately 14,000 metric tons of frozen fillets. The British agreed to pay 16.8 cents per pound f.o.b. on cod fillets. Also, in view of the lowering of world market prices on frozen fish, it is believed that the total subsidy on fish exports that the Icelandic National Treasury will have to defray in 1949 may be considerably higher than that of 1948. The Netherlands, Czechoslovakia, and France pay the Government guaranteed price for Icelandic fillets; the United States and the United Kingdom pay the world market price, which is below the guaranteed price.

TRAWLER OPERATIONS AND MARKETING OF ICED FISH: Before World War II, Iceland salted a major part of its fish catches, which was exported chiefly to Mediterranean countries, according to a September 1 report. With the disappearance of these markets during the war, Icelandic fishermen discontinued salting fish and concentrated on delivering fresh fish on ice to the United Kingdom where it was in demand. This trade proved very profitable. With a part of the proceeds earned, the Icelandic Government, under the new reconstruction program commenced in the fall of 1944, contracted for the purchase of 32 modern steam-and diesel-powered trawlers, and one was ordered by private enterprise. The first of the 33 trawlers arrived in February 1947, and the last in August 1949. At present, Iceland has 51 trawlers; 46 of them are actually operated and 5 are laid up. The Icelandic Government has placed orders for 10 additional trawlers with British firms; one was contracted for by private enterprise. These 11 vessels are expected to join the fishing fleet before 1952.

In 1948, iced fish was Iceland's most important export commodity; 124,900 metric tons were exported, valued at $13,889,008, compared with 61,008 tons, valued at $6,659,950, for the period January to June this year.

Icelandic trawlers made 201 landings during January to June 1949; 141 to the United Kingdom and 60 to German ports. Of the total number of landings, 170 were made by new trawlers and 31 by old ones. In addition, fish carriers and trawl boats landed 105 cargoes in United Kingdom ports. Whereas, the trawlers fish and deliver their cargoes in their own bottoms, the trawl boats fish and at times buy fish from other small craft; the fish carriers purchase their whole fish cargo (round and flat fish) from the small motorboats at a Government fixed minimum price of approximately $4.54 per cwt., gutted with head on.

Iced fish delivered by the new and old trawlers to the United Kingdom is not subsidized. However, the deliveries of iced fish by the trawl boats and fish carriers is subsidized by the Government depending upon the amount of fish available on local markets. The subsidy ranges, depending upon the size of the vessel, from $1.05 per cwt. to $2.10 per cwt. on the landed weight of fish, eviscerated and headless, delivered at a British port.

Since operational costs and wages are high in Iceland, it is said that only the new trawlers can operate at a profit. The average catch for the first seven months of 1949 for the new trawlers is 266 metric tons; for the old, 167 metric tons; and 50 to 300 metric tons of fish are transported by fish carriers and trawl boats.

Current indications are beginning to point to an oversupply of Icelandic fish in the United Kingdom and German markets, and marketing in those countries

may become more difficult. Moreover, the British and Germans have become more fastidious and are demanding particular species of fish. Price levels, although good, are tending to decline. It is reasonable to assume that as the British, German, and other European countries' fishing fleets increase in number and augment their catches, the demand for Icelandic iced fish will decline. Part of the trawler catches will be salted, which means that new markets for this type of fish will have to be found in Iceland's prewar markets.

* * * * *

NEW RUSSIAN EXPEDITION OFF THE NORTH COAST: Fishermen off the north coast of Iceland noticed that a new Russian expedition (which included four boats of 200 tons each) had arrived on the herring fishing grounds August 26, according to an Icelandic newspaper report. These boats were first noticed at Grimsey. The Russians were first to arrive this spring on the herring grounds and it also seems that they are going to be the last ones to leave this fall.

NOTE: Values converted on basis of 1 Icelandic kroner equals $0.1537 U. S.

Japan

FISHING FLEET, 1948: The Japanese fishing fleet as of December 31, 1948, consisted of 452,142 vessels of all types with a gross registered tonnage of

Japan's Fishing Fleet by Type of Construction

Type	Powered		Non-powered		Total	
	No. of Vessels	Tonnage (Metric Tons)	No. of Vessels	Tonnage (Metric Tons)	No. of Vessels	Tonnage (Metric Tons)
Steel	964	217,597	0	0	964	217,597
Wood	104,618	563,386	346,560	312,549	451,178	875,935
Total	105,582	780,983	346,560	312,549	452,142	1,093,532

1,093,532 metric tons, according to the August 20 Weekly Summary of SCAP's Natural Resources Section. The data was obtained from a Japanese Fisheries Agency publication, Statistic Tables of Fishing Vessels (General Report No. 1).

Fishing Fleet by Kind of Fishery

Fishery	Type of Construction	Powered		Non-powered	
		No. of Vessels	Tonnage (Metric Tons)	No. of Vessels	Tonnage (Metric Tons)
Sardine purse seine	Steel	2	30	0	0
	Wood	3,883	45,030	2,926	11,720
Total		3,885	45,060	2,926	11,720
Trawling in eastern area	Steel	30	1,074	0	0
	Wood	2,801	66,766	0	0
Total		2,831	67,840	0	0
Bull trawling in western area	Steel	440	35,405	0	0
	Wood	567	33,762	0	0
Total		1,007	69,167	0	0
Tuna and bonito	Steel	267	38,936	0	0
	Wood	1,544	62,072	0	0
Total		1,811	101,008	0	0

PROCESSING, DISTRIBUTION, AND HANDLING OF AQUATIC PRODUCTS INVESTIGATED: A visiting expert assigned to Natural Resources Section of SCAP, completed an investigation of processing, distribution, and handling of Japanese aquatic products, according to that agency's August 20 Weekly Summary. Information was obtained through intensive field trips and visits to 10 ports where albacore tuna was received and processed for export. Also inspected were canneries and cold storage plants for general sanitation and processing techniques. The principal objective was to reduce losses of aquatic products through spoilage caused by poor processing and handling methods and facilities in Japan.

Sanitary conditions observed in the fish canning industry were satisfactory. Canned tuna examined was of a passable quality. The cold storage plants were not well equipped mechanically, but most of them were operating as efficiently as possible with the equipment available. Facilities for transportation of frozen fish from receiving ports to shipping centers were not adequate.

The following summarizes the recommendations made by the visiting expert:

CANNERIES

(1) All raw fish should be inspected in the canneries, and a double check should be made on all cooked fish loins before cleaning and packing.

(2) The Japanese tuna fish canners should discontinue the wasteful practice of severing the heads and slitting the sides of tuna fish prior to precooking.

(3) After being butchered tuna fish should be washed with fresh running water instead of immersed in tubs which may become unsanitary.

(4) The precooking times and temperatures should be carefully controlled. Frozen tuna fish should not be precooked immediately after butchering but should be allowed to thaw and drain at least two hours before precooking.

(5) Daily production records should be kept showing the amount of cans packed each day, the different batch numbers, and details of the sterilization processes.

(6) Steam hose lines should be installed in all fish canners. Live steam is the most efficient and thorough cleaning agent that can be used in industrial plants.

(7) Japanese Government inspectors should place greater emphasis on the more important factors, such as plant sanitation, sterilization, and odor, color, and texture of the finished product, and less on appearance of the product.

COLD STORAGE PLANTS

(1) Modern air-blast sharp freeze equipment should be installed to reduce freezing time and improve the product.

(2) Duck boards with proper spaces for air circulation should be used on the floors and walls of all storage rooms.

(3) Fish intended for export should be kept separate from domestic fish where possible.

(4) Ice used for chilling fish should be clean and should be used in sufficient quantity.

Complete utilization of the catch of marine products in Japan will not be possible until modern equipment is available and techniques of handling and processing are improved. Technological improvements have not been available to the Japanese fish industry since 1940, and consequently most equipment is obsolete. It is hoped that the industry can avail itself of modern equipment, technological advancements, and research information in the near future.

UTILIZATION OF SCALLOPS: Scallops (Pecten yessoensis Jay) are gathered in commercially important quantities along the northern and eastern coasts of Hokkaido. Although they are collected during the entire year, the main collection period is July and August, according to the August 20 Weekly Summary.

Scallops are processed for export in dried, canned, and frozen forms. During 1948, about 105 short tons of frozen scallops, 150 short tons of dried scallops, and 450 cases (48 one-pound cans) of canned scallops were exported.

The edible portion of a scallop is only 35 percent of the total weight, including the shell. This estimated percentage is based on 30 percent for the shell, 28 percent for the adductor muscle, 7 percent for the mantle, and 35 percent for other parts (labial palp, stomach, gonads, gill, intestines, and liver).

Complete utilization is made of all parts of scallops in Japan. The adductor muscle is frozen, canned, or dried, mainly for export, and the mantle is separated and dried for local consumption in the form of "tsukudani" (preserved food boiled down in soy sauce). Other portions of the animals (entrails, etc.) are dried and used as fertilizer. The shell is used as cultch for collection of oyster spat or is sold to shell collectors for use as ornaments and utensils.

WHALE MARKING AND RESEARCH: A Japanese whaling company catcher boat left Yokosuka on July 12, 1949, on a 30-day whale marking and research trip in the authorized area north of Latitude 30° N., according to the July 16 Weekly Summary. A representative of the Fisheries Agency and representatives from each of the three major whaling companies are sailing with the vessel. They will endeavor to mark as many whales as possible, make head counts of whale populations, measure water temperature at various depths, collect plankton specimens, and measure the salinity of water. The vessel should cover about 3,500 miles during the trip. (See Commercial Fisheries Review, May 1949, page 46.)

REDUCTION OF THE EAST CHINA SEA TRAWLING FLEET: One of Japan's principal fisheries is carried on by bull trawlers (trawls towed by two boats) in the East China Sea, according to the July 16 issue of the Weekly Summary. In addition to nearly 1,000 such boats there is a fleet of about 58 large otter trawlers operating in this area. This fishery in 1947 produced about 340,000,000 pounds of fish.

Most of the vessels in the East China Sea trawling fleet were taken over by the Japanese Government and lost during World War II. Following the surrender in 1945, the East China Sea trawling fleet was rapidly restored by an extensive building program. By the spring of 1947, it appeared that the fleet was being overbuilt, and further construction was stopped by SCAP. The Japanese Government and private Japanese agencies began intensive scientific investigation of the East China Sea trawling fisheries to determine how large a catch the fishery resources of this region could support without reducing future productivity. Preliminary results of these investigations show that the resources are now being extensively overfished and that the present fleet is at least one-third larger than is needed for adequate exploitation of the resources. SCAP therefore has insisted that overfishing must be corrected through an adequate reduction in fishing intensity, before there can be any consideration by SCAP of Japanese petitions for extensions of this fishing area or discussion with other interested nations of a possible international agreement concerning fishing operations in these waters.

The ranking officials in the Japanese Fisheries Agency and some of the more enlightened leaders in the fishing industry have cooperated fully in developing a program for reducing fishing intensity but there has been much opposition and obstructionism on the part of the majority of operators. The intense opposition stems from the hope-fostered belief that the area will be extended regardless of the Japanese attitude toward overfishing and exhaustion of resources, the critical financial condition of many operators, and the unemployment which would be created by reducing the fishing fleet. In spite of this, the Japanese Government

has developed a program for reducing the fleet beginning July 1, 1949. This program will reduce the fleet of bull trawlers from 986 to 650 vessels; the fleet of otter trawlers from 58 to 43 vessels. The reduction is to be completed within one year. Boats to be eliminated will include:

(1) All vessels violating SCAP directives regarding Japanese fishing operations.

(2) Vessels not in a condition to operate or which have not operated for a long time.

(3) Vessels making only occasional trips.

(4) Vessels with conspicuously low operating efficiencies.

(5) Ten percent of the vessels owned by any one concern.

(6) All leased vessels operated by non-owners.

Sunken vessels will not be replaced until the fleet has been reduced to the approved level. On completion of the first adjustment program, there will be a further reduction of 10-15 percent of the licenses owned by concerns operating more than five pairs of bull trawlers. Otter trawlers will be reduced on the same basis as bull trawlers. Coastal vessels of not more than 50 tons will be limited to the waters West of Longitude 130° East.

The details of this program are being worked out by a committee of the Western Japanese Trawlers Association.

Compensation to the owners and crews of vessels whose licenses are cancelled, is being worked out. This will be paid from funds assessed against the vessels which continue in operation. Some subsidy also may be supplied by the national government.

PROGRAM FOR ASSISTING JAPANESE IN CONSERVATION OF AQUATIC RESOURCES: The SCAP program for assisting the Japanese in the conservation of their aquatic resources includes the following activities, according to the July 30 Weekly Summary:

(1) Education of Japanese scientists, the fishing industry, and the public to the importance of wise management and use of aquatic resources. This is being accomplished by speeches, discussions with Japanese research workers and leaders of the fishing industry, press releases, and the acquiring of research publications from other countries for the Japanese.

(2) Encouragement and advice on reorganization of aquatic research and allocation of governmental research funds to make possible more effective research on problems regarding the management of aquatic resources.

(3) Assistance and advice on:

(a) Reorganization of the Research Department of the Fisheries Agency and employment of the research personnel best qualified in the field of resource utilization.

(b) Reorganization of the system for collecting fishery statistics to improve their accuracy and adequacy for use in study of aquatic resources.

(c) Development of an adequate research program to cover the most critical problems facing the Japanese fishing industry at present, particularly those problems concerning use of resources.

(d) Training of personnel to improve the quality of Japanese research in this field.

(e) Enactment and enforcement of conservation legislation in all cases where available facts and evidence show that fishing activities are over-intensive or unwise.

(4) Promotion of consultation of Japanese research workers with research representatives of other nations to provide for cooperation in investigations of mutual interest and to supply Japanese research workers with the stimulus arising from such contacts.

* * * * *

TRADE AND BUSINESS MISSION EN ROUTE TO JAPAN: A special mission to study existing trade and business procedures and advise the Supreme Commander of the Allied Powers as to revisions which might be helpful is en route to Japan, the Department of the Army announced on September 15. The Study is being made at the request of SCAP.

Some of the fields to be examined are import and export procedures; domestic financing of trade involving foreign exchange and certain aspects of the general economic situation effecting trade and business in Japan.

Mexico

DRAFTS NEW FISHERY LAW: A new fishery law has been drafted and presented to the Mexican Congress, according to an October 5 American consular report from Mexico, D. F., which quotes accounts appearing in local papers. Under this proposed new law, there will not be two separate laws as in the past--one pertaining to local fishermen and one pertaining to foreign fishermen, and at the same time, there will not be a separate law for foreign fishermen operating in the Pacific. The basic law will be the same for both coasts of Mexico.

If this law is approved by the Mexican Congress, shrimp fishing will no longer be completely reserved for cooperative fishermen. The cooperatives will have reserved to them inland or protected waters on both coasts and the ocean waters of Lower California, Sonora, Sinaloa and Nayarit, on the West Coast. All other areas will be open for fishing by anyone. Species of fish reserved exclusively for the cooperatives would be reduced, and mullet, robalo, squid, and octopus removed from the reserved category.

One part of the law is devoted to regulating fishing in territorial waters by foreign vessels whose products are destined exclusively for foreign markets.

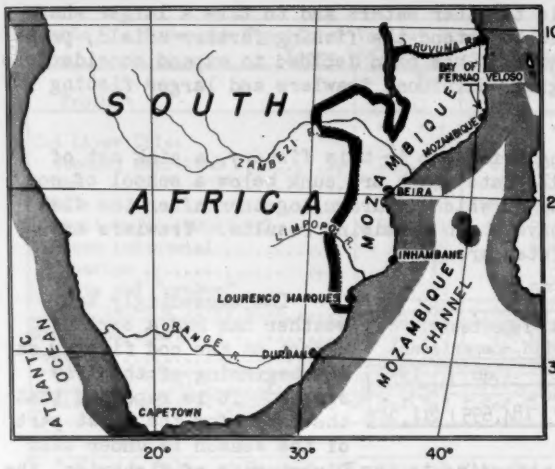
The first article of the proposed legislation determines that everything concerned with the field of fisheries comes exclusively under Federal jurisdiction, and specifically the responsibility of the Ministry of Marine.

Colony of Mozambique

FISHERIES REVIEW, 1946: Statistical data or reliable estimates beyond 1946 are not available for the fishing industry, according to a May 27 report from the American Consulate General at Lourenco Marques. In 1946, the Government reported 7,267,966 pounds of fish distributed and sold; consisted of 4,354,814 pounds of fresh fish, 1,247,209 pounds of shellfish, and 1,665,943 pounds of dry fish.

There were 4,351 persons engaged in the industry, using 2,546 pieces of various types of fishing equipment, and 1,115 small fishing boats most of which were either wind or oar propelled.

Mozambique's persistent meat shortage has created an abnormal demand for fish, and in most cases, distributors find their stocks wholly inadequate to meet the local demand.



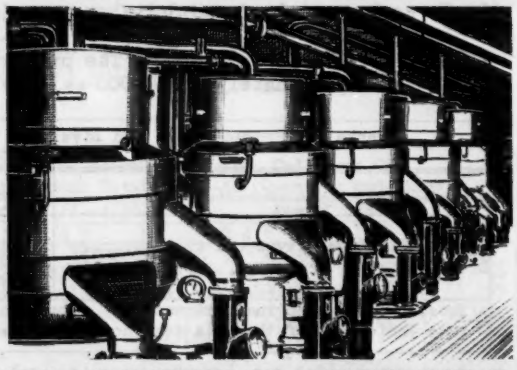
MAP SHOWS MOZAMBIQUE AND SOUTH AFRICA

During 1946, a Mozambique fishing company organized regular deep-sea fishing trips off the southern coast of Africa as far west as Capetown. The company purchased a 340-ton fishing boat in the Netherlands, and made regular monthly trips. The catches have been large and the voyages well publicized. Stocks have been completely sold out within 72 hours after the ship's return to Lourenco Marques harbor.

This same company has also started a canning factory in the outlying area of Lourenco Marques; but its output of canned fish has, thus far, been negligible because of the shortage of fresh fish supplies as well as canning materials and equipment.

Norway

COD LIVER OIL INDUSTRY 1948 AND 1949: Cod Fishing Prospects: It is the opinion of the Norwegian Directory of Fisheries that cod fishing in Norwegian waters is on a decline at the present time, according to April 8 and June 30 reports from the American Consulate at Bergen. The main cod fisheries start in January and end in May and June of each year. The size of the catch depends not only on conditions of the stock of fish but on other factors, such as weather and hydrographic conditions, competition from foreign fishing boats and trawlers, etc.



ONE TYPE OF CENTRIFUGES USED BY EUROPEAN COUNTRIES PRODUCING FISH OILS.

The 1937 class of cod, the principal source now being found and estimated to be about three times larger than normal, is on the decline and the classes of 1938, 1939, and 1940, which were poor years, are beginning to appear. Norwegian fisheries experts believe that the cod fishing in Norwegian waters will decline until the year classes of 1941 and 1942, which were comparatively good years, begin to appear. It has been found that the fish ordinarily migrate for spawning from the ages of seven to ten, the peak being at the age of ten. However, it is also believed that the introduction of larger boats and more modern equipment will enable the Norwe-

gian fishermen to follow the schools to other waters and to take a larger share of the fish. Efforts are being made to extend the fishing further afield, principally in the vicinity of Greenland. It has been decided to expend considerable funds on the purchase and equipping of additional trawlers and larger fishing boats.

Two types of nets are now being tried out in this fishery, a sink net of rectangular shape supported by small boats which are sunk below a school of cod, and a purse or ring net, the opening of which is drawn together after the fish are caught. Trials of these nets have shown promising results. Trawlers are now forbidden to be used in the Lofoten area.

Table 1 - Principal Norwegian Cod Fisheries--Production Jan. 1 to June 25, 1949 (with comparisons)

Year	1949	1948	1947	1946	1939
Period	In Metric Tons				
Jan. 1-June 25	112,995	133,712	229,117	184,695	211,247

The exceedingly bad weather has had a serious effect on the cod fishing at the beginning of the 1949 season. It is reported that the catch for the first part of the season is under that for the same period last year and, according to the Directorate of Fisheries, the outlook for the remainder of the cod fishing year is not promising.

Since 1947, the Government has been marking fish and reports of the markings made in 1947 and 1948 are beginning to be received principally from the Lofoten district. It is hoped in this way to follow the movements of the fish and so increase future fishing possibilities.

A number of expeditions have been sent out by the Research Department of the Bureau of Fisheries to investigate the fishing in the North Atlantic area and a research vessel left in May to conduct investigations in the ocean between the Norwegian mainland and Spitsbergen and off West Greenland.

Cod Liver Oil Production: The production of cod liver oil for 1948 was estimated at approximately 2,550,000 gallons.

Table 2 - Production of Cod Liver Oil by Larger Norwegian Steaming Plants, Jan. 1 to June 25, 1949 (with comparisons) 1/

Product	Period January 1 to June 25				
	1949	1948	1947	1946	1939
	In Gallons				
Steam refined cod liver oil	1,544,024	1,467,624	2,948,853	2,657,178	2,420,847
Livers to other oils	29,482	109,606	129,684	131,321	125,087
Total	1,573,506	1,577,230	3,078,537	2,788,499	2,545,934

1/ These data give no indication of the actual total production, but do give a fairly accurate indication of the relative increase or decrease in production from year to year.

Prices: The export price of medicinal cod liver oil during April 1949 was $67.50 per 30-gallon drum c.i.f. east coast of the United States. The price last year of $73.50 was increased on July 12, 1948, to $77.00 and on January 20, 1949 was reduced to the present price. It is understood that the Government export tax on this price is approximately $10.00 per drum. The Government-fixed price to the producer of medicinal cod liver oil is about $42.47 per barrel of 235 pounds f.o.b. Lofoten district and $41.46 for Finnmark district.

Table 3 - Norwegian Exports of Various Types of Fish Oils, Period Jan. 1 to June 11 for the Years 1947-49 and the Annual Totals 1946-48

Product	Period Jan. 1-June 11			Annual Totals		
	1949	1948	1947	1948 1/	1947	1946
	Gallons			Gallons		
Cod Liver Oils:						
Steamed medicinal	249,936	679,300	1,362,420	1,880,213	2,592,481	2,796,187
Raw "	159	18,651	780	19,232	2,271	48,635
Pale	749,914	1,515,598	1,045,770	3,584,432	2,375,408	1,514,462
Light brown industrial	369,581	171,794	249,490	379,091	482,568	674,175
Brown industrial	44,329	608	12,360	4,544	12,548	17,356
Stearine	737	5	-	246	-	-
Waste and "grakse"	496,728	61,579	-	902,977	-	-
Total cod liver oils	1,911,384	2,447,535	2,670,810	6,770,735	5,465,276	5,050,815
Greenland shark oil	182,466	196,097	32,370	412,826	159,840	109,448
Seal oil	408,784	102,289	144,660	339,359	444,570	207,192
Grand Total	2,502,634	2,745,921	2,847,840	7,522,920	6,069,686	5,367,455

1/Also exported 125,088 pounds of halibut liver oil.

Table 4 - Value of Norwegian Exports of Fish Oils, Period January 1 to April 30 for the Years 1947-49 and Annual Totals 1946-48

Product	Period 1/1--4/30		Annual Totals		
	1949	1948	1948	1947	1946
	U.S.$		U.S.$		
Liver Oils, chiefly from cod	2,230,333	3,566,228	13,261,881 1/	11,028,109	8,555,106
" " , from other fish	4,573,104	1,456,016	5,792,316	2,424,469	1,082,508
Seal Oil	531,648	207,078	726,390	1,027,907	286,350
Total	7,335,085	5,229,322	19,780,587	14,480,485	9,923,964

1/Of this amount, the value of medicinal cod liver oil was $4,188,069.

Stocks on Hand: According to information given by one of the largest exporters of cod liver oil, stocks are fair in spite of the comparatively small production this year. It is understood that this is partly due to high prices with a resulting decrease in orders.

Table 5 - Leading Importers of Norwegian Steamed Medicinal Cod Liver Oil Period January 1 to April 30, 1949, and Annual Totals 1946-48 (Quantity and Value)

Country	Period 1/1--4/30		Annual Totals			
	1949		1948		1947	1946
	Gals.	Value	Gals.	Value	Gals.	Gals.
United States	73,758	$156,320	368,181	$820,831	353,545	350,956
Belgium and Luxembourg	5,416	12,133	86,359	190,900	96,635	66,097
Bulgaria	-	-	29,059	72,801	79,781	14,424
China	-	-	19,443	43,883	86,808	15,560
Czechoslovakia	-	-	-	-	571,701	307,685
Denmark	4,623	10,111	48,053	111,628	41,370	78,249
France	15,639	35,794	99,700	240,849	163,736	101,073
Italy	-	-	110,240	260,465	229,991	178,846
Netherlands	8,163	16,380	285,705	478,463	175,307	214,061
Poland	-	-	252,525	574,115	267,319	122,551
Sweden	-	-	43,642	110,010	409,286	352,330
Switzerland	1,717	5,056	56,349	130,030	58,171	75,977
Turkey	-	-	97,164	246,512	-	40,974
U.S.S.R.	-	-	-	-	-	414,279
United Kingdom	5,468	12,538	42,717	95,248	16,907	72,992

Vitamin Content: The Norwegian medicinal cod liver oil ordinarily has a vitamin potency of 850 units of Vitamin A and 85 units of Vitamin D. This is understood to be less than the cod liver oil produced in the United States which has about 1,000 units of Vitamin A and 100 units of Vitamin D.
NOTE: Values converted on basis of 4.945 Norwegian kroner equal $1.00 U.S.

* * * * *

KELP BEDS CHARTED: An extensive investigation of seaweed and algae resources along the Norwegian coast by a Norwegian professor has revealed that only a fraction of this valuable raw product is being utilized at the present time, according to a Norwegian Information Service report dated September 3. The investigation shows that there are some 20 million tons of algae in coastal beds, a third of which can be processed each year without depleting the supply, according to the professor. Processed into the various algae derivatives, this supply represents a value of some $1,000,000,000 against the $600,000 in algae derivatives which Norway presently exports yearly.

To realize fully the value of these deposits, the professor recommends a complete rationalization of the industry with special attention to a refining process which will make possible the export of refined derivatives instead of a semi-refined raw product.

NEW ELECTRIC WHALE GUN DEVELOPED: A Norwegian arms firm is predicting that the new electrocuting whale gun recently developed will increase whaling efficiency by as much as 10 percent, according to an August 27 report. The electrocuting harpoon has been in experimental stages since before the war, and was used with "comparative success" during the past season.

From 20 to 25 percent of the whales struck with the regular explosive harpoon used to escape or sink--a figure which has recently been cut to some 10 percent with the use of tougher nylon line. However, using an electrocuting, rather than an explosive head, loss through sinking can be cut to nothing as the electrocuted whale remains afloat and does not struggle. The new system is much more humane and there is no danger of line breakage.

The Norwegian plant, which specializes in whale guns, has built ten new units this year. Its output of some 700 harpoon guns during the past few years has supplied Norwegian, British, South African, Newfoundland, and Japanese expeditions.

NORWEGIAN-BRITISH SEA BOUNDARY DISPUTE: The Norwegian-British sea boundary controversy is expected to come before the Court of International Justice at The Hague shortly after the beginning of next year, according to an October 8 report. It is further noted that the Court Secretariat expects the British to deliver their summons against Norway during the next few days. The summons will call up for final settlement a long-standing controversy between the two countries concerning the extent of territorial waters in which Norway can claim sole fishing rights off the Norwegian coast. The summons is being delivered by Great Britain following a mutual agreement on procedure.

According to the Norwegian Foreign Ministry, Norway can take no steps until the British summons has been delivered, although a committee has been named to prepare the case. With both sides given opportunity to submit two written pleas in addition to oral pleading before the Court, it is expected that considerable time must yet pass before the parties can obtain a decision. (See Commercial Fisheries Review, September 1949, page 38; and October 1949, page 52; and page 64 of this issue.)

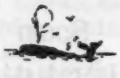
OVERSUPPLY OF WHALE BEEF: A limited freezing capacity combined with an unexpected supply and an indifferent home market are responsible for the current bottleneck in Norway's whale beef industry, according to a July 30 report. On the Norwegian west coast, coastal whalers were reportedly forced to dump their cargoes in several instances.

According to press reports, some 400 small whaling operators have had an unusually successful season in the Barents Sea, with a catch estimated at approximately 35 metric tons per boat per trip. Increased hog and cattle deliveries, however, have cut domestic demand for whale meat and freezing plants from Bergen to Kirkenes are now reportedly filled to capacity. As the meat must be frozen and packed before it can be exported, the Norwegian Supply Minister contends that plant capacity and not the availability of whales would have to determine the rate of production in this field.

PROPOSED USE OF HELICOPTERS ON ANTARCTIC WHALERS: Norwegian whalers are considering using helicopters for spotting whales in Antarctic. Whales are more easily located from the air, and with its low speed, the craft can hover over a whale and determine whether it is up to size before the harpoon is fired, according to a September 10 report.

* * * * *

TUNA FISHING IN NORTH SEA: A 70-ton fishing vessel, belonging to a Norwegian fishing company located at Stavanger, is seeking bluefin tuna on the Fladen Grounds in the North Sea, according to Fiskaren, a Norwegian periodical. Lines will be used to catch the tuna. The greater part of the catch will be frozen, but a portion will be canned. Much is expected from the experiment.



Pakistan

DEVELOPMENT OF FISHERIES: Pakistan, a member of the Indo-Pacific Fisheries Council, has officially announced that approval in principle has been given to the construction of a new fish harbor at Karachi, providing modern facilities for the berthing of fishing boats and trawlers, modern hygienic fish curing, extraction of shark liver oils, cold storage warehouses, and wholesale marketing, according to an August 3 American consular report from Karachi.

Portugal

EXPORT PROMOTION FUND: A special Export Promotion Fund to be earmarked for specific undertakings to inject new life into sales of Portuguese commodities in foreign markets was created by the Portuguese by Decree Law No. 37538 of September 2, according to a September 26 report from the American Embassy at Lisbon.

Using this fund, the Government proposes to make grants or loans to Portuguese Missions or organizations which undertake intimate analyses of foreign markets for all or specific commodities, and to finance advertising, sales promotion and protection of Portuguese products in foreign markets.

There is reason to believe that projects for early consideration will include the financing of special analyses of the American market for sardines, wines, and cork, some of these to include the enlisting of services of private market counselors.

Ryukyu Islands

U. S. ARMY SENDS MISSION TO STUDY ISLANDS' FOOD ECONOMY: A mission, which will study agricultural and fishery programs in the Ryukyu Islands with a view to increasing production and improving the diet of Island residents, left the United States the week of September 12, the U. S. Department of the Army announced on September 15.

The Mission is making the study at the request of SCAP. Members of the group will begin their work in Tokyo before proceeding to the Ryukyu Islands where the survey is expected to take about five weeks. The Mission consists of two experts from the U. S. Department of the Army and four from the U. S. Department of Agriculture.

Methods to increase food production for consumption on the Islands will be analyzed by the Mission. Local technicians will be used to carry out the Mission's recommendations.

Spain

FISHING INDUSTRIES, 1948:[1/] Introduction: Two-thirds of the Spanish population lives on the coasts which border the Mediterranean Sea, the Atlantic Ocean and the Bay of Biscay. In view of this fact and the geographic position of the Iberian Peninsula, the fishing industry in Spain has been considered as the second largest in importance, the first being agriculture.

Over 250,000 persons in Spain are engaged in full or part-time fishing activities with an annual average production of 550,000 metric tons of fish.

Fishing Fleet: Although several new vessels were added during 1948 to the Spanish fishing fleet, the 1947 total of 37,832 vessels is not believed to have changed to any noticeable extent since a number of old craft have either been lost at sea or dismantled, according to April 25 and June 1 reports from the American Consulate at Vigo.

Medium-range vessels are those from 80-200 metric tons equipped to remain on the fishing grounds from 15-30 days, working usually in pairs. This type represents a large percentage of the total Spanish fishing craft. Coastal vessels are those up to 80 metric tons which can operate from 24 to 48 hours from the home port and devoted to fish-netting all along the littoral, especially for those varieties suitable for canning.

Cod Fishery: Cod fishing and processing in Spain is a relatively new industry. The industrial processing of this species did not commence until about 1924

1/See Commercial Fisheries Review, July 1949, pp. 45-6.

when a group of Spanish capitalists, probably influenced by the satisfactory results of the then recently-organized industry in Portugal, decided to study the advisability of establishing this industry in Spain.

Since cod constitutes the principal staple food during the winter months for the medium and lower classes, Spain has always imported substantial amounts of it from Newfoundland, Norway, and other northern European countries. The domestic consumption of cod in Spain is estimated at about 100,000 metric tons per year. To remedy present shortages caused by the scarcity of foreign exchange, as well as to follow the Spanish Government's policy of self-sufficiency, factories have been established (principally in the Canary Islands) for the salting and curing of corvina which is used as a substitute for cod when the supply of the latter is insufficient to meet domestic requirements.

The fishing and curing of cod has also received great impulse during the past years. The main purpose of the new industry, which to a certain extent enjoys Governmental protection, is to obviate the necessity of importing this vital staple food from foreign countries. However, the combined catches of the three companies has thus far been insufficient to meet the domestic demand and it will probably be many years before this will be possible.

The interest of the Spanish Government in the development of this industry, is shown by the fact that the three companies engaged in this fishery have been granted large amounts of money through the Government-operated "Credito Naval" for the construction of their fishing boats. These credits cover in most instances between 60 and 80 percent of the ship's cost, bear no interest, and may be redeemed between 25 and 50 years.

COD FISHING FLEET: The three companies operating cod fishing vessels are reported to own 25 ships. These ships, which are all of similar characteristics, have a displacement of 1,200 tons and carry crews of 60 men. They are equipped to remain at sea for a period of four to six months. Fishing is usually done by means of a trawl line and the vessels have modern equipment for this type of fishing.

COD PRODUCTION: The three cod-processing plants operating in continental Spain have a combined output of 25,000 to 30,000 metric tons per year. The plant at El Ferrol del Caudillo is the largest one, followed by those at Vigo and Pasajes de San Juan, respectively.

In addition there are a number of smaller drying plants in the Canary Islands which process corvina and other similar varieties which find a ready sale in the domestic markets in the absence of cod.

Table 1 - Spanish Cod Production, 1946-48 1/

Year	Lbs.
1948	113,204,159
1947	96,713,544
1946	43,827,520

1/ Gross or round weight. Actual landings are 60 percent less since the fish is headed, gutted, and bones removed at sea. The waste is thrown overboard.

It is interesting to note, however, that in spite of the industry's expansion, imports cannot totally be dispensed with and during the early part of 1949, the first postwar shipments of Norway cod arrived at Spanish ports. These shipments are expected to continue, but their size will, of course, largely depend on the availability of foreign exchange or the balance of payments under the Spanish-Norwegian trade agreement.

A larger number of cod fishing vessels of Spanish flag were operating in 1948 and that accounts for the substantial increase of cod production in that year.

There are no figures available as to the production of cod liver oil.

Fishing Grounds: The principal fishing grounds for the Spanish fleet are as follows:

Grounds	Type of Fish Caught
Newfoundland and Greenland	Cod
Purcupine, Grand and Petit Soles, and La Rochele	Hake and small hake
Cantabrican and Portuguese coasts	Sardines, jurel, bonito, anchovies and other small varieties

Table 2 - Spanish Fish & Shellfish Production & Average Landed Prices, 1940-48

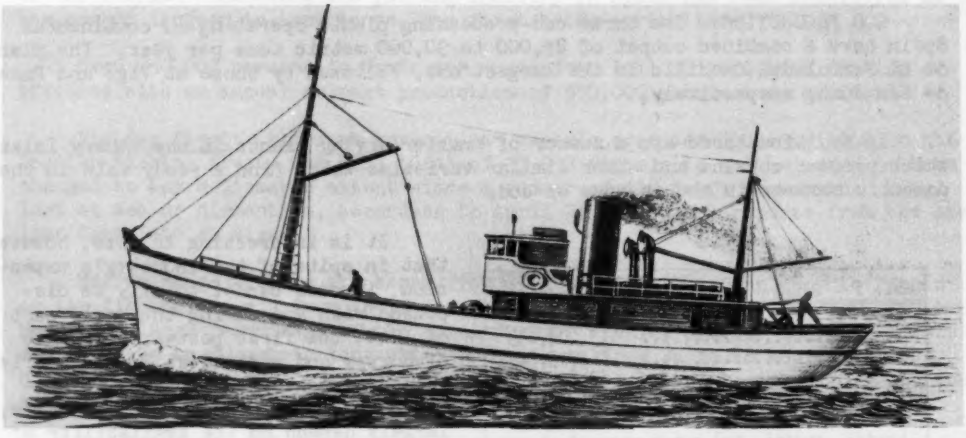
Year	Quantity	Avg. Prices
	Lbs.	$ per cwt.
1948[1/]	1,045,630,299	15.51
1947	1,249,251,091	14.85
1946	1,307,412,671	11.99
1945	1,195,579,440	9.59
1944	1,018,743,585	9.37
1943	946,219,267	9.71
1942	999,422,600	9.16
1941	974,212,186	9.27
1940	951,811,742	6.96

1/ Catches of cod not included. However, in 1947, the average price for cod was $5.18 per cwt. (1948 value and average price not available--quantity totaled 113,204,159 pounds).

Vessels with home ports in southern Spain also fish along the African coast.

Operation Costs: The immediate necessity of the Spanish fishing industry is the procurement, at reasonable prices, of large quantities of materials and equipment needed to continue operations on a normal scale. Normally most of these requirements were obtained from abroad. According to the trade, costs of operation of the ships during 1948 increased more than 30 percent over 1947, which year was already considered unprofitable.

Catches and Prices: Excluding cod catches, 1948 production of fish and shellfish declined 9 percent in volume and 11 percent in value.



A MODERN SPANISH TRAWLER

During 1948, anchovies and bonito and tuna were the only species caught in larger quantities than the previous year. Sardines and hake, the varieties on which fishing interests evaluate the prosperity or failure of the fishing campaigns, show appreciable declines in volume when compared with 1947. The price trend for these varieties, however, continued upward.

Table 3 - Spanish Catches of Principal Species and Average Landed Prices, 1947-48

Species	1948		1947	
	Quantity	Value	Quantity	Value
	Lbs.	$ per cwt.	Lbs.	$ per cwt.
Sardines	167,483,243	12.79	220,065,747	12.01
Anchovies	97,283,958	8.53	55,626,496	11.31
Bonito & tuna ..	40,711,499	24.21	35,648,644	27.62
Hake	63,522,400	33.92	96,404,601	33.59
" , small	115,258,290	21.65	119,644,092	20.16

The larger catches of anchovies were not a source of profit to fishermen. Most of the catch had to be disposed of fresh at lower prices since the fish packing industry, which is the chief consumer, was reluctant to place any large orders because it had accumulated stocks. Difficulty was encountered in disposing of stocks in normal consuming markets abroad as a result of the unfavorable rate of exchange which existed during the year.

Unexpected large runs of young tuna and bonito in the southern Atlantic waters off the Canary Islands helped to keep the volume of the catches at the level of the previous year. The fish-canning industry established in the Islands was caught unprepared and was not able to absorb any substantial quantities for preservation, and a larger percentage of the catch was consumed in the Islands or shipped to southern Spanish ports for salting.

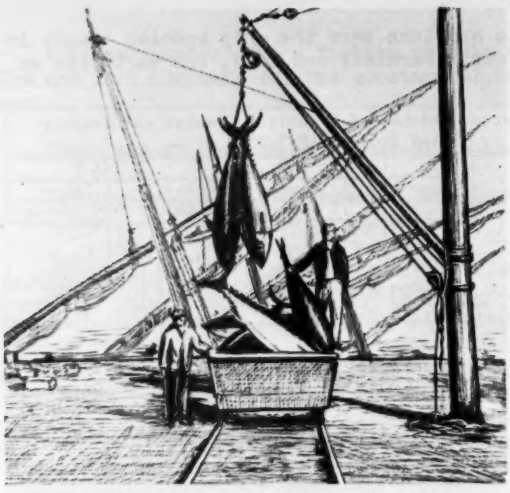
Fish Canning Industry: The year 1948 was most unfavorable for the canners. For normal profitable development the industry must have an export market, but owing to the unfavorable exchange rate of the peseta, the canners have been unable to compete with foreign packers. However, during the last month of the year, the exchange rates were revised and small quantities of canned fish, chiefly anchovies, were exported.

Table 4 - Spanish Exports of Canned and Salted Fish

Year	Canned Fish			Total Salted Fish
	Sardines in oil	Other Fish in oil	Total Canned	
	Lbs.	Lbs.	Lbs.	Lbs.
1948	6,981,968	5,504,099	12,486,067	2,195,431
1947	5,374,512	6,673,757	12,048,269	8,432,369
1946	7,347,846	3,150,367	10,498,213	1,311,200
1945	3,930,300	7,836,726	11,767,026	3,402,740
1944	1,350,360	1,999,666	3,350,026	822,800
1943	3,573,240	2,479,605	6,052,845	25,372,160
1942	5,282,640	6,591,781	11,874,421	11,650,540
1936	9,154,640	2,730,330	11,884,970	653,840
1935	47,877,500	13,626,138	61,503,638	3,322,880

The industry is also faced with raw material shortages such as tin plate, solder, and other essential materials which, in normal times, were imported from abroad. Much of the machinery and equipment needs either replacement or repair. According to the secretary of the Fish Packers Association in Vigo, if the industry were at present to resume large scale operations, it would require a minimum of $27,000,000 to keep the factories working at normal capacity.

During 1936 to 1942, there was an embargo on exports, the total production having been consumed in the home markets in substitution for other food products not then available. Exports during 1948 were somewhat higher than in the previous 12 months due in part to the "grant" given by the Government to the packers permitting them to retain 33 percent of the foreign currency obtained from their ex-



UNLOADING TUNA AT A SPANISH PORT FROM A SAIL-FISHING VESSEL.

The industry prepares a diversified number of varieties of fish, but principally depends on sardines, tuna and bonito, and anchovies in oil.

Outlook: Since the Government has not taken any steps to assist the Spanish fishing industry, which has entered its fifth year of unsatisfactory returns, the outlook for the fishing fleet in 1949 is very discouraging.

There are signs, however, that the present year may see the turning point for the better for the fish-canning industry, if fish suitable for preservation becomes available. Packers are confident that Government assistance will finally be given to the industry by lifting many of the present controls and by granting more favorable exchange rates to enable them to combat foreign competition.

NOTE: Values converted on basis of 10.95 Spanish pesetas equal $1.00 U. S.

Sweden

NEW FLOAT FOR TRAWL NETS INVENTED IN SWEDEN:[1/] A new type of float for herring trawl nets has been invented by two Swedes, according to a September 15 report from Goteborg. The new float is built on the lines of a hydroplane and the faster it is drawn through the water, the greater its lift, directly opposite to the operation of the present glass-ball floats which lose lifting power with increased speed. The new float has been thoroughly tested in the tank of the local Ship Testing Institute and in actual use at sea on the Government's inspection ship, the Eystrasalt.

The float looks like a toy speed boat. It is 23 cm. (approximately 9 inches) in width, 38 cm. (approximately 15 inches) in length. The bottom is shaped like the "V" of a speed boat, while the top is stream-lined like an airplane wing. At the "stern" there are two rudders, one horizontal and one longitudinal. In the center of the "keel" is a fastener, and a line runs from it to the trawl net.

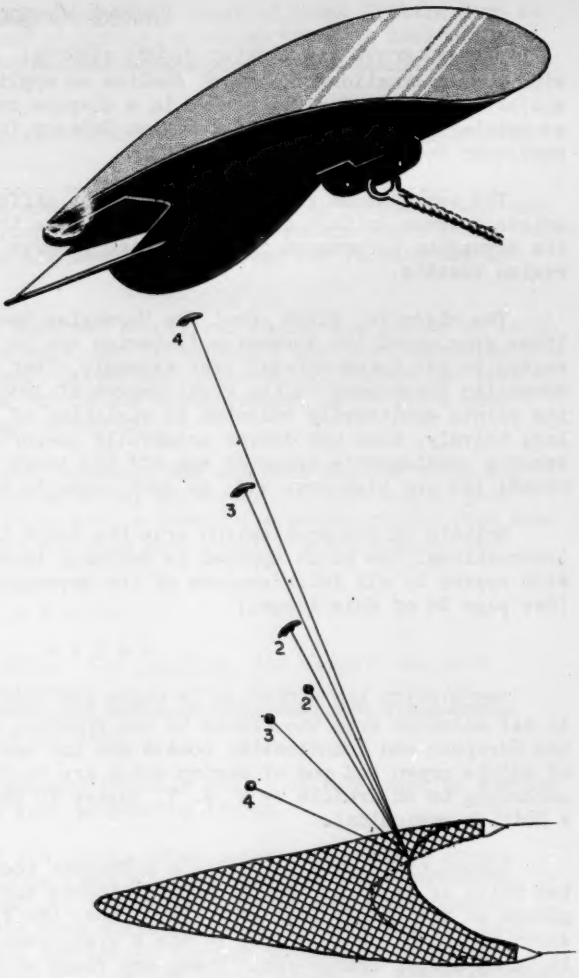
The models used in developing this float have been made of wood or light metal, but in all probability plastic will be used when it gets into production. Wood has the disadvantage of becoming impregnated by water at great depths, making it water-logged. If it were made of hollow metal, it would not be able to withstand the pressure at great depths. But this objection has been overcome by boring a small hole near the stern of the float through which water can enter and compress the air within, thus equalizing the outside and inside pressures. When the float rises, the air will expand as the water pressure decreases, thus forcing the water out of the float.

1/See page 63 of this issue.

At a speed of 2 knots, the new float has a slightly greater lifting capacity and smaller resistance than the usual glass ball, but when the speed is increased, the difference is great. While the lifting power of the ball is the same or slightly less, its resistance has increased to 7.7 pounds. But the new float, when pulled at 3 knots, increases its lifting capacity to 11.9 pounds, while its resistance has only increased to 5.5 pounds. At 4 knots, the ball's resistance has increased to 11 pounds, while its lifting power remains at about 5.5 pounds, But at 4 knots, the new float has increased its lifting power to 17.4 pounds, while its resistance has increased only to 8.8 pounds.

The inspection vessel, Eystrasalt, in its tests fully confirmed the superiority of the new float. Using the ship's herring trawl with the usual number of glass balls, the upper and lower lips of the trawl net were found to be about 6½ feet apart. Then the center ball was replaced by one of the new floats and the opening was then found to be 8½ feet. When half of the balls were replaced by the new float, the opening increased to 15 feet, a result which far exceeded expectations; and when the new float was substituted for all the balls, the mouth spread to 36 feet.

It would be possible to make similar planes for the lower lip of the trawl net mouth which could be constructed to cut downwards. These would reduce the weight of the leads necessary to keep the lower section down.



TOP DRAWING IS SIDE VIEW OF NEW-TYPE FLOAT. LOWER DIAGRAM INDICATES LIFTING POWER AND DIRECTION OF LIFT OF THE USUAL GLASS-BALL FLOATS AND THE NEW FLOAT. THE LOWER THREE LINES INDICATE THE POSITION OF THE GLASS FLOAT AT 2, 3 AND 4 KNOTS, WHILE THE UPPER THREE INDICATE THE POSITION OF THE NEW FLOAT AT THE SAME SPEEDS, RESPECTIVELY. LENGTH OF LINES INDICATES FORCE OF THE LIFTING POWER, WHILE THE ANGLE OF THE LINES INDICATES THE ANGLE OF THE PULL. THE FORCE OF THE LIFTING POWER IN THE BALL FLOAT IS PRACTICALLY THE SAME AT ALL THREE SPEEDS, WHILE THE LIFTING POWER OF THE NEW FLOAT GREATLY INCREASES WITH INCREASE IN SPEED.

The new float has already been registered as an invention and the owners plan to enter foreign markets by granting rights to manufacture on a royalty basis.

United Kingdom

BRITISH-NORWEGIAN FISHING RIGHTS DISPUTE: The British Government has filed with the International Court of Justice an application instituting proceedings against the Norwegian Government in a dispute over fishing rights, according to an October 3 report from the American Embassy in London which quotes a London newspaper despatch.

The application recalls the fact that differences have from time to time arisen between Britain and Norway relating to the limits at sea within which the Norwegian Government is entitled to reserve fishing exclusively to Norwegian vessels.

The claim is, first, that the Norwegian Government when it prescribes base lines from which the Norwegian fisheries are to be delimited, is bound to have regard to the international law; secondly, that the base lines prescribed by the Norwegian Government in the royal decree of 1935, consist of straight lines joining points arbitrarily selected in violation of the principles of international law; thirdly, that the decree unlawfully purports to close to British fishing vessels considerable areas of sea off the coast of Norway which under international law are high seas and, as such, open to the fisheries of all nations.

Britain in its application asks the court to declare the principles of international law to be applied in defining these base lines and to award damages with regard to all interferences of the Norwegian Government in this respect. (See page 56 of this issue.)

* * * * *

DESCRIPTION AND MARKETING OF PRAWN AND SHRIMP: Prawn and shrimp are found in all climates from the Arctic to the Tropics, although the species found around the European and Scandinavian coasts are the more hardy. There are two varieties of edible prawn and one of shrimp which are caught off the coasts of Great Britain, according to an article by W. A. T. Baxter in the August 20 Fish Trades Gazette, a British periodical.

Description: The prawn has a prominent toothed and pointed rostrum and has two pairs of pincers; the second pair (being the larger and more developed) are placed at the end of long whip-like limbs; the front pair are equipped with stiff, short bristles. When alive, it has a grey-green body with red stripes; when cooked, it turns a deep orange-red. Prawn are found where the coast is stony and are usually caught in baited pots or bags.

The brown shrimp has no toothed and pointed rostrum, the front end of the carapace being short and blunt. The first pair of legs are short and flattened, each terminating in a little movable hook-like claw that can be closed against a short sharp spine; the second pair of legs have very minute claws, while the remaining three pairs of walking legs are long and slender and have pointed ends. When alive, it has a grey-greenish tint and is speckled brown like the sand in which it is found; when cooked, the familiar brown color appears.

The so-called pink shrimp is in reality not a shrimp at all, but a small prawn; it differs in not having any visible pincers on its first pair of legs; the second pair, however, are long and slender with very minute pincer claws, although it has the toothed and pointed rostrum similar to the larger common prawn.

Shrimp are dredged, and along the sandy east coast of Great Britain form an industry of some importance. In some districts, a shrimp trawl is used behind a horse and cart, while in deeper waters, sailing boats (really small trawlers) are employed.

Marketing: Shrimp are usually cooked on board the vessel immediately after catching.

Considerable amounts of shrimp are used for manufacturing purposes, the most common of which is the familiar shrimp paste, although of recent years shrimp which do not attain the highest standards are used and processed for fertilizers and poultry foods.

In several of the continental European countries, shrimp are peeled in large quantities before being offered for sale, and in this form are used extensively in hors d'oeuvre, salads, and sauces. In Germany and Belgium, before the last war, a method of mechanical peeling was in use which reduced labor costs enormously and did not damage the shrimp in any way.

The peeling of shrimp in England, however, has not been carried on to any extent commercially. The public prefer to buy shrimp by the pint and to peel them as they eat them. There is, of course, a demand for peeled shrimp from restaurants and catering establishments but on a much smaller scale than on the European Continent.

* * * * *

"FAIRFREE" TO FISH ON GRAND BANKS: The Fairfree, the largest and most modern British quick-freeze fishing vessel, will sail at an early date for the Grand Banks off the coast of Newfoundland, according to the British periodical, The Fishing News, of August 13, 1949.

The ownership of this vessel changed recently and it is now owned by another English firm with interests in the food processing field.

The vessel recently completed its trials after being converted to diesel operation. Important features include the incorporation of a whaleback stern, over which the trawl nets are mechanically shot, and the paravane arrangement used to keep the two glove-like nets open while trawling. When full, the nets are mechanically hauled and the fish are passed through hatches to cleaning boards on the deck below. Processing will follow normal practice, the fish being packaged and quick frozen. After removing from the freezer, the frozen fish is stored in special fish holds, where a system of booms is used to facilitate storage.

NEW TYPE TRAWLER "PRINCE CHARLES": A new trawler was recently built in England which has an experimental deep-freeze plant and storage room, with filleting and loading tables close by, according to reports in the British periodical, The Fishing News. The outward appearance of this new oil-fired trawler, Prince Charles, is the same as the most recent trawlers built in England. The innovations in design have been made internally.

The deep-freeze plant and storage room (with a capacity of 10 metric tons) are arranged under the main deck forward of the fish hold (wood lined throughout and with a capacity of 16,000 cubic feet) with the filleting section on top under the top-gallant forecastle. To assist in preserving the fish, a cooling plant has been installed. A thermometer on the bridgehouse enables the skipper to keep a check on the temperature in the hold.

All of the crew are accommodated either amidships or aft, with access under cover to other parts of the vessel (right up to the bridge) through the engine and boiler casings. They will not have to cross the open foredeck in bad weather.

Returning to Grimsby on September 13 from a maiden voyage of 22 days to the White Sea, the Prince Charles landed approximately 500,000 pounds of fish with a gross value to the fishermen of 10,392 pounds sterling (approximately $29,100). Included in the cargo were five metric tons of quick-frozen fish fillets experimentally processed at sea.

With reference to quick-freezing at sea, the skipper stated that freezing on board takes some time, but he believes that it can eventually be done on a large scale.

On this trip, the vessel used a new float[1/] invented by Mr. Jack Phillips of Grimsby, and it is reported that the tests with this new float were successful. The buoyancy and lifting power of the floats are retained no matter which way the tide is running or how the ship is turning, according to the vessel's skipper. The new float has a curved hydrofoil at the base which gives three times the lifting power of an ordinary float. After using 60 of the old-type floats during the first two days of fishing, the new-type floats were used for the balance of the trip and it required only 40 floats to achieve better results.

NOTE: Value converted on the basis of one pound sterling equals $2.80 U.S.

1/See page 63 in this issue.

TO DEVELOP SALES OF KIPPERS IN U. S.: With a view to developing the sales of British kippers in America, the chairman of the British Herring Industry Board is expected to come to the United States some time in October for a period of two months. The Board is making a special study of the American market, according to the September 10 issue of the British periodical, The Fishing News, in order to explore the possibilities of increasing the demand for British kippers in the United States.

* * * * *

POSTWAR GROWTH OF SCOTTISH FISHERIES: A report recently compiled by the Scottish Home Department on Scottish fisheries is the first Government report to be issued since the war, according to an August 18 report from the American Consulate at Glasgow. It shows that the industry has grown since it was curtailed by World War II and states that it is on the whole remunerative to the men involved.

The number of Scottish vessels engaged in all types of fishing was greater than before the war (5,298 by the end of 1948 as compared with 5,067 in 1938). This increase was due in part to the fact that many small motor vessels which had previously been unregistered were now in commission. There was, however, a decrease of almost 700 in the number of fishermen engaged in the industry as compared with prewar (17,228 in 1948 and 17,915 in 1938).

The total landings of herring in 1948 amounted to 326,256,000 pounds, which compared favorably with an average of 294,672,000 pounds during the years 1934 to 1938. The 1948 catch was sold at an average price of $3.81 per cwt., or almost three times more than for the period of 1934-38 when it was sold for $1.41 per cwt. The total Scottish landings in 1948 are the highest since 1935.

The 1948 catch of whitefish amounted to 375,950,736 pounds and was worth $33,724,885. Although this was slightly lower than for 1947, it was 89,600,000 pounds more than for 1938.

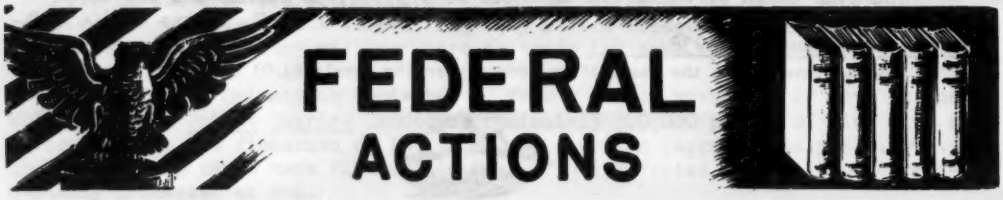
NOTE: Value converted on the basis of one pound sterling equals $4.03 U. S.

FRIED ROSEFISH FILLETS

2	pounds rosefish fillets	1	tablespoon milk or water
1	teaspoon salt	1	cup breadcrumbs, cracker crumbs, cornmeal or flour
1/8	teaspoon pepper		
1	egg		

Sprinkle both sides of the fillets with salt and pepper. Beat egg slightly, and blend in the milk. Dip fish in the egg and roll in crumbs. Place fish in a heavy frying pan which contains about 1/8 inch melted fat, hot but not smoking. Fry at a moderate heat. When fish is brown on one side, turn carefully and brown the other side. Cooking time is about 10 minutes depending on the thickness of the fish. Drain on absorbent paper. Serve immediately on a hot platter, plain or with a sauce. Serves 6. If rosefish fillets are not available, any other type of small fillets could be substituted.

A Fish and Wildlife Service tested recipe. This is one in the series of recipes using fishery products tested and developed in the Service's test kitchens.



Department of Commerce

BUREAU OF FOREIGN AND DOMESTIC COMMERCE

BRITISH TOKEN IMPORT PLAN ADMINISTRATION PROCEDURES REVISED: The procedure governing the administration of the British Token Import Plan and the role of the Office of International Trade in this plan have been revised. The Federal Register of September 13, 1949, contains the new regulations.

The only item of interest to the fishing and allied industries included in the commodities subject to the plan is canned lobster.

The British Token Import Plan is an arrangement with the British Government which permits United States manufacturers, their authorized agents, or other qualified exporters, with established prewar trade connections in Great Britain to export to that area token shipments of specified commodities, the importation of which the British Government prohibited as a war measure.

* * * * *

POSITIVE LIST OF COMMODITIES AMENDED: The Positive List of Commodities was amended effective August 12, 1949, and the list published in the Federal Register of September 2, 1949. The list includes those commodities which require a validated export license from the Department of Commerce for shipment to any destination, whether to Country Group R and O destinations or to Country Group R destinations only (country groups for which validated licenses must be obtained). No edible fishery products appear in this list.

Items in Positive List of Commodities of Interest to the Fishing and Allied Industries

Dept. of Commerce Schedule B No.	Commodity	Unit	Processing Code and Related Commodity Group	G.V.1/ Dollar Value Limits	Validated License Required
	Animal and Fish Oils and Greases, Inedible				
080905	Sperm Oil	Lb.	FATS	10	R
	Fodders and Feeds, N. E. S.				
119900	Fish meal for feed	L. ton	CERL	100	RO
	Cotton Manufactures				
319900	Fish netting, tarred or not tarred (not a finished product)	-	TEXT 16	100	R
	Vegetable Fibers and Manufactures				
	Flax (linen) fabrics, wide and narrow				
339915	Gill nettings	Lb.	TEXT	1,000	R
339915	Net fabrics, for fishing nets	Lb.	TEXT	1,000	R
	Silk and Manufactures				
	Silk manufactures, n. e. s.:				
379900	Fishing line, unfinished	-	TEXT	1,000	R
379900	Fishline, braided	-	TEXT	1,000	R
	Synthetic Fibers and Manufactures				
	Synthetic textile manufactures, n. e. s.:				
385300	Nets and netting, fabricated	-	TEXT 18	100	R
	Iron and Steel Manufactures				
612200	Tin cans, finished or unfinished	Lb.	TMPL	1,000	R
	Vegetable Fibers and Manufactures				
	Flax, hemp, and ramie yarns, and manufactures, n. e. s.:				
984900	Fishing nets, commercial	-	TEXT	1,000	R
984900	Seines, commercial	-	TEXT	1,000	R

1/Has reference to the value limits under the general license, Shipments of Limited Value.

All edible fishery products and other commodities of interest to the fishing and allied industries not included in the Positive List of Commodities as amended may be exported under the general license GRO, which requires only that a shipper's export declaration describing the commodity or commodities to be exported be filed with the Collector of Customs at the port of exit or with the Postmaster at the place of mailing.

Food and Drug Administration

PROPOSED CHANGES IN CANNED SHRIMP AND OYSTER LABELING REQUIREMENTS: With reference to the regulations on the inspection and labeling of canned shrimp and canned oysters published in codified form in the Federal Register of November 10, 1948, certain minor changes proposed by the Food and Drug Administration were announced in the Federal Register of October 6, 1949.

Canned Shrimp: It is proposed to amend paragraphs (a) and (c) of Section 155.10 and to add a new paragraph, numbered (d), to that section. The changes are indicated by underscoring:

> "155.10 Labeling. (a) Labels on canned shrimp packed and certified under Section 155.0 to 155.13 may (instead of shall) bear the mark 'Production Supervised by U. S. Food and Drug Administration,' .... Such mark if used shall be plainly and conspicuously displayed .... (c) No commercial brand or brand name appearing on labeling approved as authorized under paragraph (b) of this section and bearing the mark 'Production Supervised by U. S. Food and Drug Administration,' and no labeling simulating. ...."

The new paragraph (d) merely states that canned shrimp labeling shall be used only as authorized, and unauthorized use renders the user liable to certain penalties.

Canned Oysters: It is proposed to amend paragraphs (a) and (c) of Section 155.40. The proposed changes are the same as given above for canned shrimp, except for paragraph (d) which is already part of the original regulations for canned oysters.

With reference to these proposed changes, all interested parties were given an opportunity to submit their views in writing to the Federal Security Administrator, by November 6, 1949

Interstate Commerce Commission

REPORT ON RAILWAY EXPRESS' REQUEST FOR INCREASE IN ICE CHARGES: In connection with the request of the Railway Express Agency for increases in the ice charges, the Interstate Commerce Commission recently issued its Examiner's report on I.C.C. I & S Docket No. 5612 (Billing Weights on Iced Fish and Shellfish-Express). The report states that: "Proposed increases in billing weights for fish and shellfish, in boxes or other containers with ice as a refrigerant, when shipped in less-carload quantities by railway express, not shown to be just and reasonable." Exceptions to the examiner's report can be filed up to October 17, 1949.

The increases mentioned by the examiner refer to minimum charges which must be added for water ice in shipments of fresh and frozen fish and shellfish. The increases requested were:

> (1) For fresh and frozen fish, where a 25 percent addition to the net weight of the shipment is now made, a 50 percent addition was requested. (This section excludes the crustaceans listed in (2) below.)

(2) For crawfish, crawfish tails, crab meat, dressed frogs and frog legs, live or boiled lobsters, lobster meat, lobster tails, shrimp and shrimp meat, where a 50 percent addition to the weight of the shipment is now made, a 75 percent addition was requested.

(3) For mixed shipments of fish and oysters, where a 25 percent addition to the net weight of the shipment is now made, a 50 percent addition was requested.

With reference to these increases, the Examiner's proposed findings stated:

"The Commission should find, subject to provisos herein recited, that the present billing weights are and for the future will be just and reasonable for shipments of fresh fish and shellfish having gross weights at origins not greater than 175 and 200 percent, respectively, of the net weights shipped during the 9 months, September to May, and not greater than 200 and 225 percent, respectively, of net weights shipped in the other 3 months; provided that the billing weight for any shipment shall not be less than the weight of the commodity plus the actual or estimated weight of the container or containers; and provided further that this finding shall not apply to any container in which there is more than 100 pounds net weight of fish or shellfish.

"The Commission should further find that the billing weights herein proposed by respondent for the future will be just and reasonable

(1) for shipments of fish and shellfish having gross weights at origins greater than 175 and 200 percent, respectively, of the net weights shipped during the 9 months, September to May, and greater than 200 and 225 percent, respectively, of net weights shipped in the other 3 months; and

(2) for a net weight of more than 100 pounds of fish or shellfish in one container in any month regardless of the gross weight.

"For mixed shipments of fish and oysters, charges should be based on billing weights for fish, as hereinbefore outlined, plus the weight of the oysters. The findings herein do not apply to shipments accompanied by dry ice as a refrigerant, nor to shipments in Church containers.

"The Commission should further find that it will be just and reasonable for respondent to publish and collect, for reicing shipments, a charge of 20 cents for each reicing of a box or barrel containing 50 pounds or less of fresh fish or other seafood; 25 cents for 51 to 100 pounds; and 30 cents for a box or barrel containing more than 100 pounds of net weight.

"The Commission should further find that the suspended schedules are not shown to be just and reasonable. An order should be entered requiring their cancellation and discontinuing the proceeding, without prejudice to the filing of new schedules in accordance with conclusions herein expressed."

The proposed findings are not effective until approved at a regular meeting of the I.C.C.

* * * * *

MANY TRUCKS CARRYING FRESH AND FROZEN FISH NOW EXEMPTED FROM I.C.C. REGULATIONS: On September 23rd the Interstate Commerce Commission made the following decision in the Monark Egg Case docketed by the Commission as MC 89207:

"On further consideration, we find that the term 'fish (including shell fish)' as used in section 203 (b) (6) of the Interstate Commerce Act, includes frozen, quick frozen, and unfrozen fish in the various forms in which it is shipped, such as live fish, fish in the round, beheaded and gutted fish, filleted fish, beheaded shrimp, and oysters, clams, crabs, and lobsters, with or without shells, including crab meat and lobster meat, but excluding fish in hermetically sealed containers or fish which has been otherwise treated for preserving such as smoked, salted, pickled, spiced, corned or kippered."

This decision confirms broad exemptions from the Interstate Commerce Act to trucks transporting fresh and frozen fish. Shipments of these products can now be made in trucks which will be subject to only a minimum of regulation in the form of safety requirements with respect to equipment, brakes, lights, and regulations with respect to hours of service. Trucks carrying fresh and frozen fish, provided these trucks do not carry for compensation any passengers and property other than exempt property as defined in section 203 (b) (6) of the Inter-

state Commerce Act, are now exempt from regulations of the Interstate Commerce Commission which require that they obtain permits or licenses from the Commission, file schedules of tariffs, etc. (See Commercial Fisheries Review, May 1949, page 63).

Department of State

RATIFICATION OF INTERNATIONAL FISHERY AGREEMENTS: The President on September 1, 1949, ratified the International Convention for the Northwest Atlantic Fisheries and the Convention between the United States and Mexico for the establishment of an International Commission for the Scientific Investigation of Tuna; and on August 30, 1949, ratified the Convention between the United States and Costa Rica for the establishment of an Inter-American Tropical Tuna Commission.

The Senate on August 17 had previously unanimously advised and consented to the ratification of these three international fishery agreements, according to an announcement by the Secretary of State on August 18.

Identification of the agreements is as follows:

1. International Convention for the Northwest Atlantic Fisheries signed at Washington, February 8, 1949, by plenipotentiaries of the United States of America, Canada, Newfoundland, Denmark, France, Iceland, Italy, Norway, Portugal, Spain, United Kingdom, all countries that have a fishing interest in the area. Covers the species of the Northwest Atlantic Ocean that are of international interest. (See Commercial Fisheries Review, March 1949, pp. 73-82; December 1948, pp. 65-74.)

2. Convention for the Establishment of an Inter-American Tropical Tuna Commission, signed at Washington, May 31, 1949, by plenipotentiaries of the United States of America and Costa Rica. (See Commercial Fisheries Review, June 1949, pp. 59-62.)

3. Convention for the Establishment of an International Convention for the Scientific Investigation of Tuna, signed at Mexico City on January 25, 1949, by plenipotentiaries of the United States of America and the United Mexican States. (See Commercial Fisheries Review, February 1949, pp. 68-9; December 1948, pp. 74-77.)

These conventions will not enter into force until ratifications of the other governments have been completed, except that the Northwest Atlantic Convention may enter into force when four countries have ratified. Since the conventions were negotiated upon the initiative of the United States, it is believed that notification of ratification by the United States will stimulate prompt ratification by the other nations involved.

All three of the agreements establish commissions charged with the duty of scientific investigation of the particular fisheries. No regulatory powers are involved, although in the case of the Northwest Atlantic Fisheries the Commission is empowered to recommend regulations which may be issued and enforced by the individual contracting governments.

The fisheries concerned supply the American people with more than one billion pounds of protein food annually. The tuna fishery of the West Coast caught

enough tuna in 1948 to fill 7 million cases, valued at $112,600,000 to the canners. There has been comparatively little scientific investigation of the species that support this fishery, and further knowledge is essential for the protection of the resource upon which this rapidly-expanding industry is dependent.

In the Northwest Atlantic, the oldest American fishery, depletion of the stocks has been evident for some years and has become especially acute on the New England banks.

Eighty-first Congress (first session)

SEPTEMBER 1949

Listed below are all the public bills, resolutions, etc., introduced and referred to committees, or passed by the Eighty-First Congress and signed by the President during September 1949 (unless otherwise specified), which affect in any way the fisheries and fishing and allied industries.

PUBLIC BILLS AND RESOLUTIONS INTRODUCED AND REFERRED TO COMMITTEES:

House of Representatives:

H. R. 6190 (Wickersham) - A bill to establish rearing ponds and a fish hatchery in southwestern Oklahoma; to the Committee on Merchant Marine and Fisheries.

H. R. 6204 (King) - A bill to implement the International Convention for the Establishment of an International Commission for the Scientific Investigation of Tuna, signed at Mexico City under date of January 25, 1949, by the United States of America and the United Mexican States, and the Convention for the Establishment of an Inter-American Tropical Tuna Commission, signed at Washington under date of May 31, 1949, by the United States of America and the Republic of Costa Rica; to the Committee on Foreign Affairs.

The following bills introduced prior to September 1, 1949, were not previously shown under this section:

H. R. 5991 (Walter) - A bill to promote the exploration, development, and conservation of certain resources in the submerged coastal lands and to provide for the use, control, and disposition of said lands and resources and of lands beneath inland waters; to the Committee on the Judiciary. This bill states that "...for the purposes of this Act the seaward boundary of every coastal State shall be deemed to be three geographical miles from its coast line, or at such distance as it existed at the time such State became a member of the Union..." It further states that "... Any State which is found by appropriate court action to have owned or possessed, prior to the passage of this Act, the rights of management, use, or disposition of the lands, minerals, or other natural resources within its submerged coastal lands shall not by this Act be deprived of any such rights and powers...." (Introduced August 15, 1949.)

H. R. 5992 (Walter) - Same as 5991. (Introduced August 15, 1949.)

H. R. 5894 (Lucas) - A bill to provide for the amendment of the Fair Labor Standards Act of 1938, and for other purposes; to the Committee

on Education and Labor. With reference to minimum wages and maximum hours, this bill exempts "any employee employed as a seaman; or any employee employed in the catching, taking, harvesting, cultivating, or farming of any kind of fish, shellfish, crustacea, sponges, seaweeds, or other aquatic forms of animal and vegetable life, including the going to and returning from work and including employment in the loading, unloading, or packing of such products for shipment or in propagating, processing, marketing, freezing, canning, curing, storing, or distributing the above products or byproducts thereof...." (Introduced August 5, 1949.)

H. R. 5615 (Kee) - A bill to promote the foreign policy of the United States and to authorize participation in a cooperative endeavor for assisting in the development of economically underdeveloped areas of the world; to the Committee on Foreign Affairs. (Introduced July 12, 1949.)

H. R. 4893 (Colmer) - A bill to amend the Agricultural Act of 1948 by adding thereto a new section to establish an average parity price for fats and oils and to aid in maintaining such parity price to producers; to the Committee on Agriculture. This bill includes marine oil produced in the United States. (Introduced May 27, 1949.)

Senate

S. 2561 (Saltonstall) - A bill to establish a program of foreign economic development; to the Committee on Foreign Relations.

BILLS PASSED AND SIGNED BY THE PRESIDENT:

Trade Agreements Extension Act of 1949:

H. R. 1211, (P. L. 307), signed September 26, 1949 - Authorizes extension of reciprocal trade agreements.

AQUATIC RESOURCES OF THE RYUKYU AREA

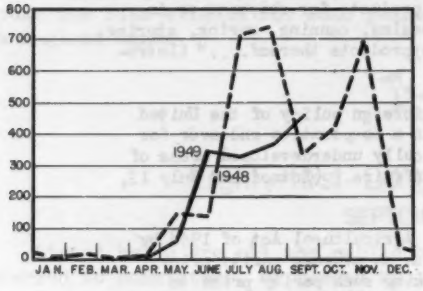
The offshore fishing in the Ryukyu Islands is done primarily in the deeper waters through which the major flow of the Kuroshio passes, or where offshoots of the current tend to swing against areas of lesser depth. Three major types of fishing operations have been practiced in the offshore waters: pole and line angling for skipjack; long line fishing for tunas, spearfishes, and sharks; and hook and line angling for bottom fish (chiefly snappers) in areas some distance from the main island groups but where submerged reefs are known to be present. During 1926-40, the offshore fisheries of the Ryukyu Retto produced an annual average catch of slightly more than 4,150 metric tons. The skipjack accounted for most of the catch, normally constituting about 80 percent of the total offshore landings. The greater part of this was processed into dried skipjack stick and exported to Japan.

--Fishery Leaflet 333

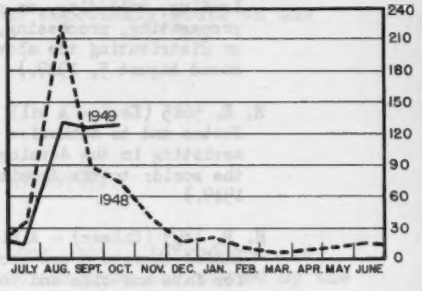
CANNED FISHERY PRODUCTS

In Thousands of Standard Cases

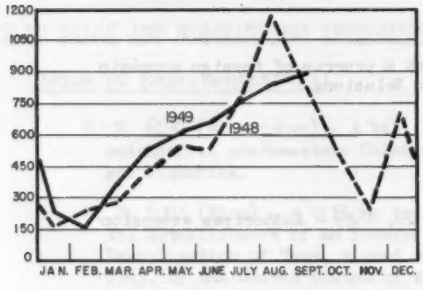
MAINE - SARDINES, ESTIMATED PACK



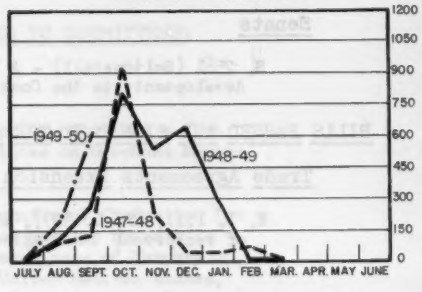
UNITED STATES - SHRIMP



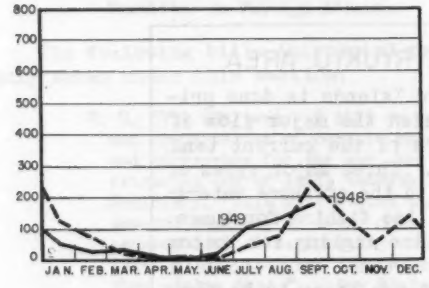
CALIFORNIA - TUNA



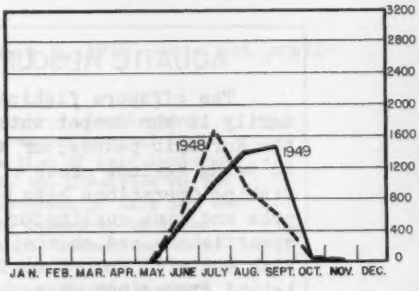
CALIFORNIA - PILCHARDS



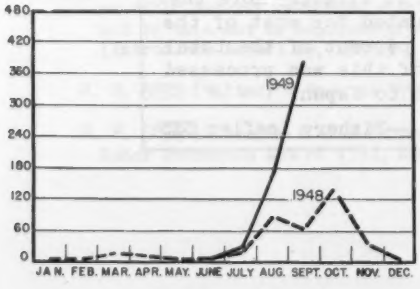
CALIFORNIA - MACKEREL



ALASKA - SALMON



WASHINGTON - PUGET SOUND SALMON



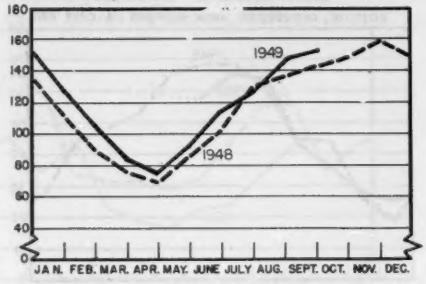
STANDARD CASES

Variety	No. Cans	Can Designation	Net. Wgt.
SARDINES	100	1/4 drawn	3 1/4 oz.
SHRIMP	48	—	5 oz.
TUNA	48	No. 1/2 tuna	7 oz.
PILCHARDS	48	No. 1 oval	15 oz.
MACKEREL	48	No. 300	15 oz.
SALMON	48	1-pound tall	16 oz.

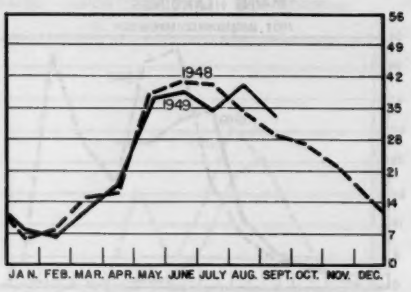
COLD STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS

In Millions of Pounds

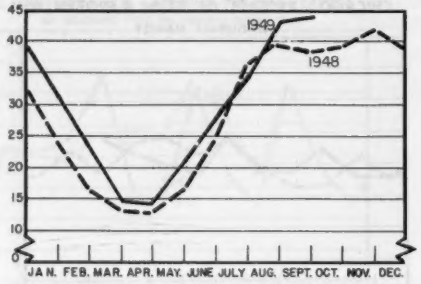
U.S. & ALASKA - HOLDIN S OF FROZEN FISH



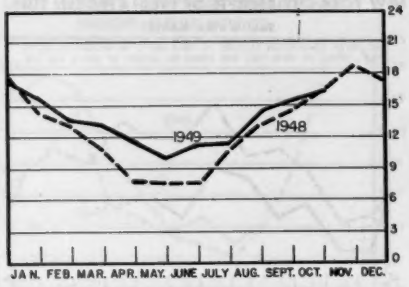
U.S. & ALASKA - FREEZINGS



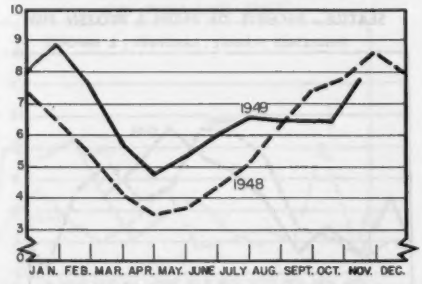
NEW ENGLAND - HOLDINGS OF FROZEN FISH



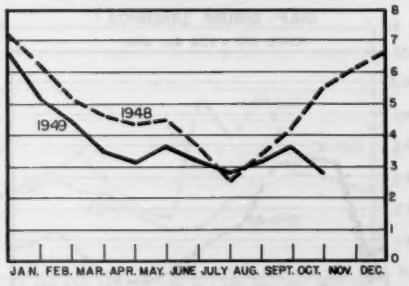
NEW YORK CITY - HOLDINGS OF FROZEN FISH



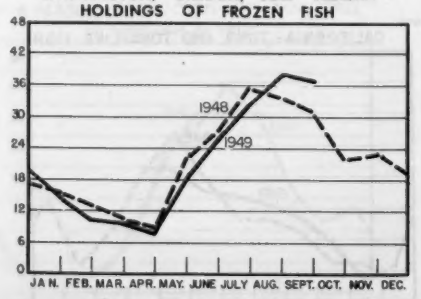
CHICAGO - HOLDINGS OF FROZEN FISH



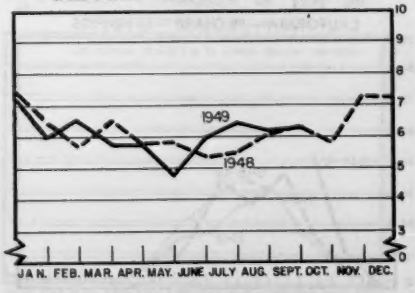
GULF - HOLDINGS OF FROZEN FISH



WASHINGTON, OREGON, AND ALASKA - HOLDINGS OF FROZEN FISH

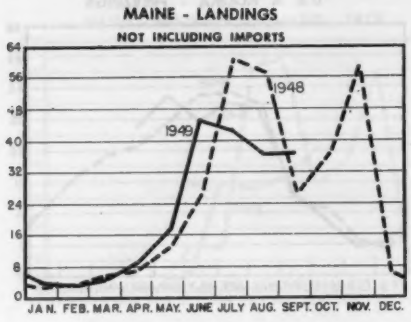


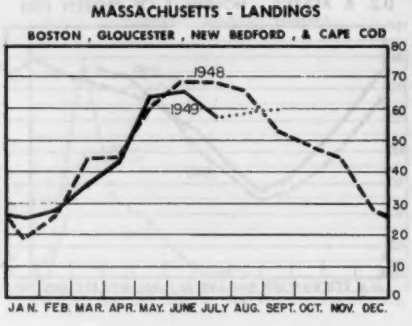
CALIFORNIA - HOLDINGS OF FROZEN FISH

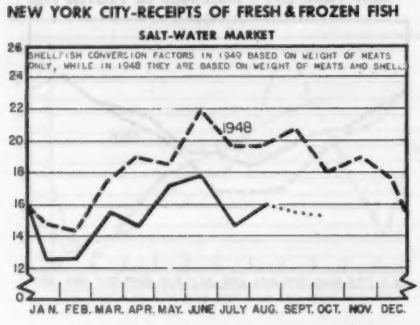


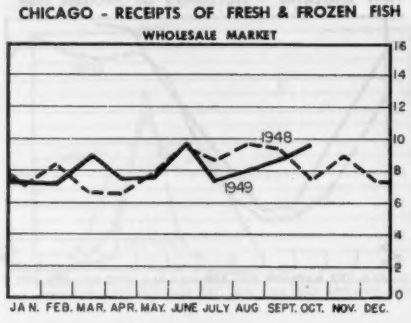
LANDINGS AND RECEIPTS

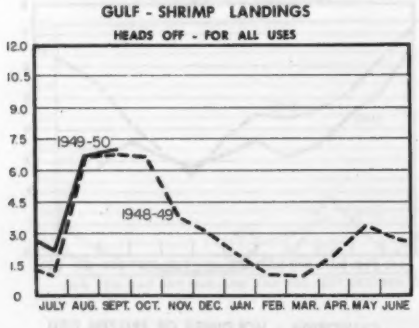
In Millions of Pounds

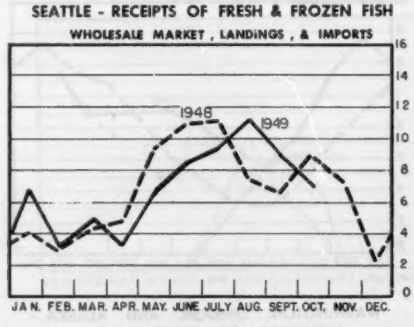



MASSACHUSETTS - LANDINGS
BOSTON, GLOUCESTER, NEW BEDFORD, & CAPE COD
1948
1949
JAN. FEB. MAR. APR. MAY. JUNE JULY AUG. SEPT. OCT. NOV. DEC.

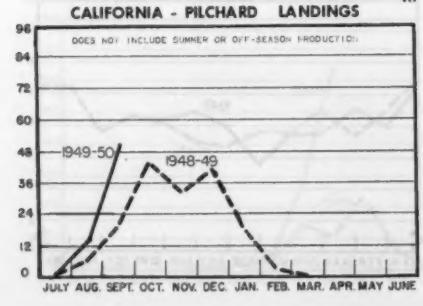

NEW YORK CITY-RECEIPTS OF FRESH & FROZEN FISH
SALT-WATER MARKET
SHELLFISH CONVERSION FACTORS IN 1949 BASED ON WEIGHT OF MEATS ONLY, WHILE IN 1948 THEY ARE BASED ON WEIGHT OF MEATS AND SHELL.
1948
JAN. FEB. MAR. APR. MAY. JUNE JULY AUG. SEPT. OCT. NOV. DEC.

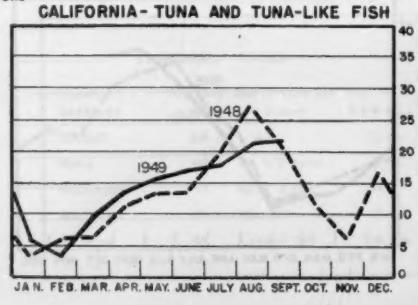





SEATTLE - RECEIPTS OF FRESH & FROZEN FISH
WHOLESALE MARKET, LANDINGS, & IMPORTS
1948
1949
JAN. FEB. MAR. APR. MAY. JUNE JULY AUG. SEPT. OCT. NOV. DEC.

In Thousands of Tons

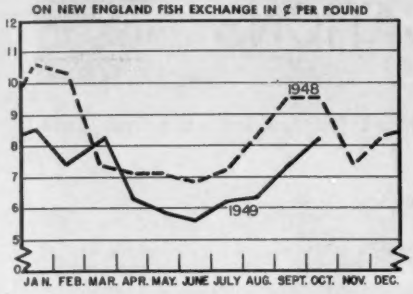

CALIFORNIA - PILCHARD LANDINGS
DOES NOT INCLUDE SUMMER OR OFF-SEASON PRODUCTION
1949-50
1948-49
JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE



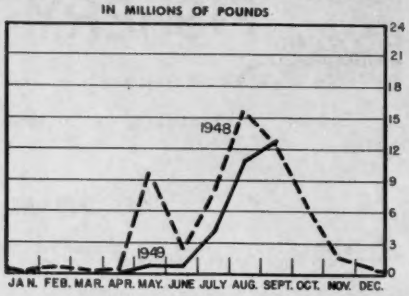
•••••••• ESTIMATED

PRICES . IMPORTS and BY-PRODUCTS

BOSTON - WEIGHTED AVERAGE PRICE
ON NEW ENGLAND FISH EXCHANGE IN ¢ PER POUND

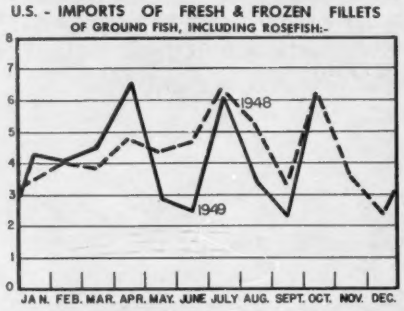


MAINE - IMPORTS OF FRESH SEA HERRING
IN MILLIONS OF POUNDS

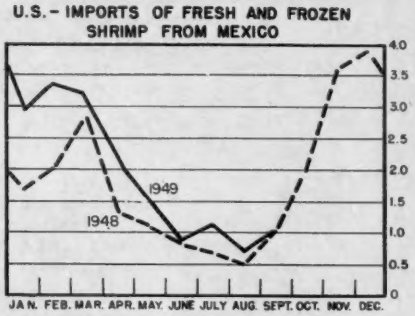


In Millions of Pounds

U.S. - IMPORTS OF FRESH & FROZEN FILLETS
OF GROUND FISH, INCLUDING ROSEFISH:-

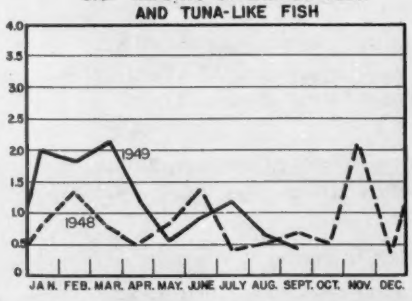


U.S. - IMPORTS OF FRESH AND FROZEN
SHRIMP FROM MEXICO

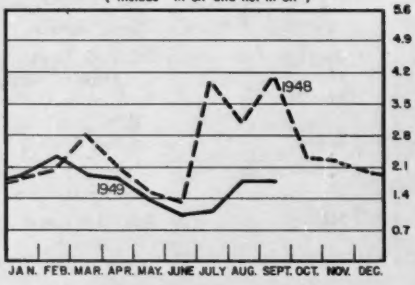


IN MILLIONS OF POUNDS

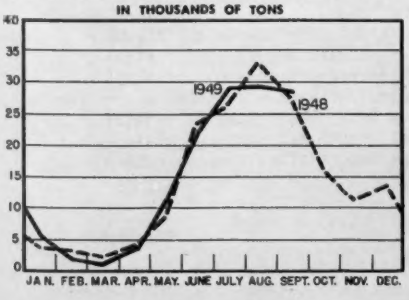
U.S. - IMPORTS OF CANNED TUNA
AND TUNA-LIKE FISH



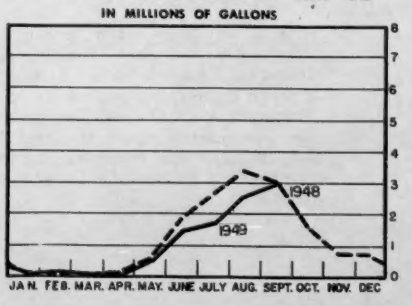
U.S. - IMPORTS OF CANNED SARDINES
(Include in oil and not in oil)

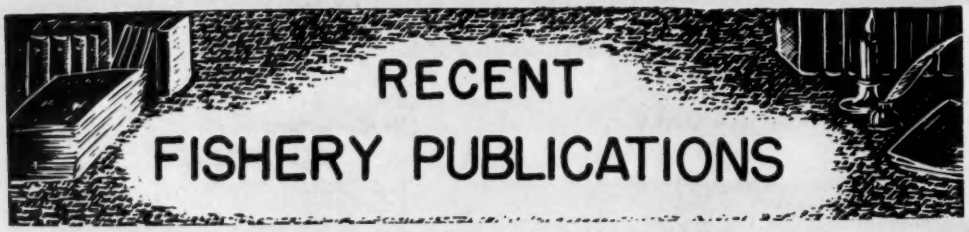


U.S. & ALASKA - PRODUCTION OF FISH MEAL
IN THOUSANDS OF TONS



U.S. & ALASKA - PRODUCTION OF FISH OIL
IN MILLIONS OF GALLONS





Recent publications of interest to the commercial fishing industry are listed below.

FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.
ECML- ECONOMICS AND COOPERATIVE MARKETING LEAFLETS.
FL - FISHERY LEAFLETS.
MDL - MARKET DEVELOPMENT SECTION LISTS OF DEALERS, LOCKER PLANTS, ASSOCIATIONS, ETC.
SEP.- SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.
SL - STATISTICAL SECTION LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
WL - WILDLIFE LEAFLETS.

Number		Title
CFS-495		- Fish Meal and Oil, August 1949, 2 p.
CFS-496		- Maine Landings, July 1949, 4 p.
CFS-497		- Canned Fish & Byproducts Annual Summary 1948, 20 p.
CFS-498		- Massachusetts Landings, June 1949, 14 p.
SL-106	(Revised)	- Firms Canning Shad or Shad Roe, 1948, 1 p.
SL-110	(Revised)	- Firms Canning Oysters and Oyster Products, 1948, 2 p.
SL-112	(Revised)	- Firms Canning Shrimp, 1948, 2 p.
SL-151	(Revised)	- Firms Manufacturing Fish Meal, Scrap, Oils, etc., 1948, 7 p.
SL-157	(Revised)	- Firms Manufacturing Fish Liver Oils, 1948, 2 p.
SL-159	(Revised)	- Firms Manufacturing Fresh-Water Mussel-Shell Products, 1948, 1 p.
FL-160	(Revised)	- Partial List of Journals and Newspapers Concerning the Fisheries, 7 p.
FL-344		- Control of Aquatic Plants in Ponds and Lakes, 26 p., illus.
FL-336b		- Quarterly Outlook for Marketing Fishery Products, Oct.-Dec., 1949, 21 p., illus.
FL-352		- United States Per Capita Consumption of Fishery Products, 10 p.
MDL-51	(Revised)	- Officials of Refrigerated Locker Plant Associations, State and National, 3 p.
ECML-3		- Questions and Answers on the Fishery Cooperative Marketing Act of 1934, 6 p.
WL-329		- Old Man of the Pribilofs (A Story of the Alaska Fur Seals), 13 p., illus.

Sep. 238 - Interstate Fishery Cooperation and Conservation

* * * * *

Effects of Oil Mixed with Carbonized Sand on Aquatic Animals, by Walter A. Chipman and Paul S. Galtsoff, Special Scientific Report: Fisheries No. 1, 72 p., illus., processed, August 1949. Limited distribution. This report is a study of the effects on aquatic organisms of oil mixed with carbonized sand undertaken by the Service at the request of the Department of the Navy. Describes in detail the experiments conducted dealing with the toxic effect of oil and sand mixture, and contains the observations of the authors on the amount of carbonized sand required to submerge a known quantity of oil.

MISCELLANEOUS PUBLICATIONS

THE FOLLOWING PUBLICATIONS MAY BE OBTAINED, IN MOST INSTANCES, FROM THE AGENCIES ISSUING THEM.

Annual Report of the Delaware Commission of Shell Fisheries of the State of Delaware for the Fiscal Year Ending June 30, 1949, 8 p., processed. The Delaware Commission of Shell Fisheries, Dover, Del., 1949. Describes the activities of the Commission in regulating and controlling the oyster industry of Delaware. The production of the seed beds as well as of the leased grounds is shown.

Annual Report of the Game Department, Part II--Fisheries (for the year ended December 31, 1946, including the years 1940-45), 82 p., with tables, 3s. (approximately 42 cents). Game Department, Entebbe, Uganda Protectorate, 1948. Data on production, gear, fishermen, fishing effort, and prices for the fisheries of the various lakes in the Protectorate are given in this booklet. In addition, there is a report on nets (supplies, quality, prices, types, etc.) and on the imports and exports of dried fish.

The Common Food-Fishes of the Madras Presidency, by Rao Sahib Dr. D. W. Devanesen and K. Chidambaram, 79 p., printed. Department of Industries and Commerce, Madras, India, 1948. This booklet is a list of the important food-fishes of Madras, giving spawning-season, season of abundant catches, food, methods of capture, economic importance, etc. The book is divided into three parts: Part I - "Cartilaginous Food-Fishes;" Part II - "Marine Food-Fishes;" and Part III - "Fish Byproducts and Glossary."

Current Tables Pacific Coast North America, 1950, Serial No. 727, 145 p., with diagrams, printed, 25 cents. Coast and Geodetic Survey, U. S. Department of Commerce, Washington, D. C. or its agencies. Detailed data are contained in this publication on daily ocean current preditions, current differences and constants, velocity of current at any time, duration of slack, coastal tidal currents, wind currents, and current diagrams.

The ECA and Small Business, 16 p., printed. Economic Cooperation Administration, Washington, D. C., August 1949. This booklet is to help the small independent manufacturer or producer, so that he may avoid lost motion, unnecessary expense and possible financial loss. It lists some of the more important problems which one seeking to expand export trade under the Marshall Plan will encounter. Although it does not specifically mention fishery products, the general information will be of value to those interested in exporting these products.

Employment in Canadian Fisheries, Vol. 1, Preliminary Survey, 46 p., processed, illus. Dominion Department of Fisheries, Ottawa, Canada, May 1949. A preliminary survey of information on the conditions of work in the fishing industry of Canada collected for the International Labor Office. It contains the Office's questionnaires, a summary of conditions of work in the fishing industry of Canada (wages, hours, social security, conditions of employment and welfare), and a discussion of Federal assistance to the fishing industry and position of fishermen under the workmen's compensation acts of the various Canadian Provinces.

Establishment of the Indo-Pacific Fisheries Council (Agreement between the United States of America and Other Governments), Treaties and Other International Acts Series 1895, Publication 3473, 7 p., printed, 5 cents. U. S. Department of State, Washington, D.C., 1949. (For sale by U. S. Government Printing Office, Washington, D. C.) Full text of agreement formulated at Baguio February 26, 1948, and entered into force November 9, 1948.

Fifth Annual Report, 1948, Maryland Board of Natural Resources, Annapolis, Md., 186 p., illus., tables. Contains, among others, annual reports of the Department of Tidewater Fisheries giving fisheries production for 1947; Department of Game and Inland Fish, which includes a report on inland fish management; Department of Research and Education giving data on crab, oyster, fish and other fisheries investigations; and a general review of the year 1947 listing new fisheries laws and regulations.

The Fisheries Conventions (Hearing on July 14, 1949, before a Subcommittee of the Committee on Foreign Relations, United States Senate, Eighty-First Congress, First Session, on the Ratification by the United States Government of the International Convention for the Northwest Atlantic Fisheries signed at Washington, February 8, 1949, Executive N; Convention with Mexico for the Establishment of an International Commission for the Scientific Investigation of Tuna, signed at Mexico City, January 25, 1949, Executive K; Convention for the Establishment of an Inter-American Tuna Commission, signed at Washington, May 31, 1949, Executive P), 131 p., with map, printed. Available only from the Senate Committee on Foreign Relations until exhausted. Contains the messages from the President transmitting the three conventions and the full texts of the conventions. In addition, it contains the various statements presented at the hearing.

"Fisheries of Norway Achieved New Record Catch During Past Year," by Shirley G. MacDonald, article, Foreign Trade, September 2, 1949, vol. vi, no. 143, pp. 516-19, illus. Department of Trade and Commerce, Ottawa, Canada. A review of the production and exports of the Norwegian fisheries. Also discusses the extension of trawler fishing in Norway.

Fresh and Frozen Fish (Report of the Secretaries of State and Commerce and of the United States Tariff Commission in Response to House Resolution No. 174, 81st Congress), 126 p., with tables, processed, distribution limited. U. S. Tariff Commission, Washington, D. C., September 1949. This report contains House Resolution No. 174; Section A deals with production, imports, exports, tariff status of fishery products, prices, and fishing industries in principal countries supplying the United States imports of fishery products; Section B discusses production, imports, exports, consumption and duties of fillets, together with factors influencing production and imports and factors affecting domestic and foreign cost of fillets; Section C deals with fresh or frozen fish (other than fillets); and Section D contains the conclusions and recommendations together with a general discussion on the impact of foreign competition and possible courses of action. (See page 26 of this issue for an abstract of the conclusions and recommendations.)

Handbuch del Fischkonservierung (Fish Canning Handbook). by Otto Wille, vol. III of a series (Der Fisch), in German, 732 p., with numerous tables, DM 35 (approx. $8.00). Hans A. Keune-Verlag, Hamburg, Germany. Contains 27 chapters giving information and data on the worker in the fisheries; the science of fish preservation--machines and processes used; the preservation of fresh fish; the freezing, drying, smoking, pickling, and salting of fish; the packing of anchovies; canning of fish in oil and other methods of preservation.

The Maryland Crab Industry, 1948, by Lewis Eugene Cronin, Publication No. 76, 42 p., illus., printed. Chesapeake Biological Laboratory, Board of Natural Resources, Solomons Island, Maryland, May 1949. Beginning with 1948, this agency has begun to obtain complete statistics on the catch of blue crabs in Maryland. This bulletin contains 1948 statistics on catch per man per day by various gears in various areas. No attempt is made in this report to analyze the significance of the various catch records. Also included are the results of a poll of the Maryland crab packers and shippers in 1948, which gives for the first time a summarization of the thinking of a large part of the industry on many important questions.

Meat Selections of City Families, Commodity Summary No. 1 (Based on 1948 Food Consumption Surveys, Preliminary Reports 1 to 5), 9 p., processed, free. Bureau of Human Nutrition and Home Economics, Agricultural Research Administration, U. S. Department of Agriculture, Washington, D. C., August 1949. For a picture of urban food practices throughout the United States, 1,600 housekeeping families of two or more persons living in 68 cities were asked for information on their food consumption during one week in the spring of 1948, and approximately 250 housekeeping families of two or more persons gave similar data during the winter of 1948 in each of four cities (Birmingham, Buffalo, Minneapolis-St. Paul, and San Francisco), and the data was published as preliminary reports numbers 1 through 5. From the above reports, some figures on meat (including fish and shellfish) have been brought together in this publication.

"Methods of Estimating Total Runs and Escapements of Salmon," by George A. Rounsefell, article, Biometrics, June 1949, vol. 5, no. 2, pp. 115-126, illus., printed, $1.00 per issue. American Statistical Association, Washington, D.C. Discusses a method for estimating the total run and the escapement in a salmon fishery, thus providing basic data necessary for intelligent management. It has been shown for one great river, the Fraser, that the size of each year's run is closely correlated with the number of spawners. It has also been shown that the total number of salmon that can be harvested from a run on a permanent basis cannot be increased beyond a certain point merely by increasing the number of spawners, unless either the spawners are so distributed over the watershed as to make better use of the available areas, or the environment of the nursery areas is changed.

"1948 Food Consumption Surveys;" Nutritive Value of Family Diets, Four Cities, Winter 1948, I. "Average Values for Families Classified by Income, Birmingham, Ala., Buffalo, N. Y., Minneapolis-St. Paul, Minnesota, and San Francisco, Calif.," Preliminary Report No. 6, FE 620, 32 p., processed, 6/30/49; (Tables 1 to 4 present data on the average nutritive value per person and per nutrition unit per day of food consumed at home, Tables 5 to 24 present data on the average quantity of specified foods, including fish and shellfish, consumed at home per person and per household in a week and the percentage of households consuming these foods, and tables 25 and 26 show the contribution of specified groups of food to the total nutritive value of diets of all families studied in the four cities). Family Food Consumption in Four Cities, Winter 1948, A Summary Report, Preliminary Report No. 7, FE 749, 25 p., processed, September 1949. (A summary of preliminary reports numbers 1 to 4.) See Commercial Fisheries Review, March 1949, p. 93; July 1949, p. 63; and August 1949, p. 57. Available free from the Bureau of Human Nutrition and Home Economics, Agricultural Research Administration, U. S. Department of Agriculture, Washington 25, D. C.

Problems in Enumeration of Populations of Spawning Sockeye Salmon (1. "A Study of the Tagging Method in the Enumeration of Sockeye Salmon Populations," by Gerald V. Howard; 2. "A Mathematical Study of Confidence Limits of Salmon Populations Calculated from Sample Tag Ratios," by D. G. Chapman), Bulletin II, 85 p., printed. International Pacific Salmon Fisheries Commission, New Westminister, B. C., Canada, 1948. Since the use of tagging to determine the size of spawning stocks of the Fraser River sockeye was adopted by the Commission, many problems have arisen through its application in different types of streams which indicated that the original material had to be studied carefully with a view to determining as far as possible the limits of accuracy of the population measurements obtained by tagging. Accordingly, the data were subjected to a statistical analysis commensurate with their basic accuracy, and paper number one of this bulletin is a report on this analysis. Paper number two discusses the problems concerning the mathematical background of the various measurements of accuracy of calculated populations. A new solution worked out by the author which presents the advantages of a sound mathematical background as well as greater symmetry in the results is presented. The author brings together and compares the other methods that have been developed for determining confidence limits and in doing so has clarified many points left obscure in previous applications by defining the conditions under which different methods of calculation should be used.

Prospects for the 1949-50 Herring Fishing Season, by J.C. Stevenson, Circular No. 19, September 1949, 3 p., processed. Pacific Biological Station, Fisheries Research Board of Canada, Nanaimo, B. C. Contains a prediction of the success of the 1949-50 herring fishing season off British Columbia by districts.

Regulation and Investigation of the Pacific Halibut Fishery in 1948, Report of the International Fisheries Commission No. 14, 30 p., printed. Inter-

national Fisheries Commission, Seattle, Wash., 1949. A brief review of the Commission's administrative and investigational activities in 1948. The booklet contains data on the 1948 halibut fishery, including length of season, landings by area, incidental catch, condition of and changes in the composition of stocks, and marking experiments. It concludes with the text of the Convention between Canada and the United States for the preservation of the halibut fishery of the northern Pacific Ocean and Bering Sea signed at Ottawa, January 29, 1947, and the 1948 Pacific Halibut Fishery Regulations.

Report on the Fisheries of Scotland 1939-48, 112 p., printed, 2s. (approx. 28 cents). Scottish Home Department, Edinburgh, Scotland, 1949. (Available from His Majesty's Stationery Office, London, England). This report surveys the fishing industry of Scotland. It gives detailed data on conditions affecting the fishermen, fishing fleet, fisheries (herring, white fish, shellfish, salmon, etc.), production, prices, control of the industry, scientific investigations, and fishery harbors. Includes tables, graphs and detailed statistics.

"Story of Australian Fish Canning Industry," Fisheries Newsletter, July 1949, vol. 8, no. 4, complete issue devoted to this article, 24 p., illus., printed. The Commonwealth Fisheries Office, Dept. of Commerce and Agriculture, Sydney, Australia. Reviews the Australian fish canning industry. The publication contains a discussion of the achievements and prospects of the industry, and the production of canned fish by individual leading canneries. In addition, a directory of fish processors is included.

Summary of United States Foreign Trade in Foodstuffs and Allied Products for June 1948 and June 1949 and for the First Six Months of 1948 and 1949, by Helen B. Ingle, Foods and Related Agricultural Products, World Trade in Commodities Supplement, September 1949, vol. VII, part 6-7-8, supl. no. 50, 17 p., processed. Office of International Trade, Department of Commerce, Washington 25, D. C. A summarized analysis of the United States imports and exports trade, including fishery products.

Transactions of the American Fisheries Society, 1947 (Seventy-Seventh Annual Meeting, Denver, Colorado, September 10-12, 1947), vol. 77, 370 p., printed, $4.00. American Fisheries Society, Ann Arbor, Mich., 1949. Part I consists of the papers presented at the Seventy-Seventh Annual Meeting of the Society. Included are the following papers relating to commercial fisheries: "Some Trends in the Commercial Fisheries of Lake of the Woods, Minnesota," "Estimating the Fish Production of Great Slave Lake," "Reformation of Excised Fins of King Salmon Fingerlings and Its Effects on Recognition of Marked Adults," "Age and Growth of Lake Whitefish, Coregonus clupeaformis (Mitchill), in Lake Erie;" Part II is a report of the Symposium (Fish and Wildlife in Relation to Flood-Control and Navigation Developments and to the Elimination of Pollution of Public Waters). Part III reports on the business sessions of the Society.

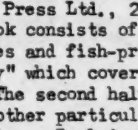
Sea Turtles and the Turtle Industry (of the West Indies, Florida and the Gulf of Mexico, with Annotated Bibliography), by Robert M. Ingle and F. G. Walton Smith, special publication, 107 p., printed. The Marine Laboratory, University of Miami, Coral Gables, Fla., in cooperation with The Caribbean Research Council, August 1949. Several hundred papers, reports and personal communications have been abstracted by the authors and the essential information regarding the biology of the sea turtles and the condition of the industry is presented in summarized form in this publication. The sources are listed in the form of an annotated bibliography. Includes data on green, loggerhead, hawksbill, and leatherback turtles. Discusses the value and administration of the fishery in Florida, Bermuda, Bahamas, Cuba, Cayman Islands, Haiti, Puerto Rico, Virgin Islands, St. Kitts-Nevis, Antigua, Monserrante, St. Vincent, St. Lucia, Barbados, Grenada, Tobago, Trinidad, British Guiana, Panama, Venezuela, Costa Rica, Nicaragua, Honduras, Guatemala, British Honduras, and Mexico.

The Smelt, Capelin and Silverside, by R. A. McKenzie and L. R. Day, Circular, General Series, No. 15, August 1949, 4 p., processed. Atlantic Biological Station, Fisheries Research Board of Canada, St. Andrews, N. B., Canada. How the smelt, capelin and silverside can be distinguished by means of their different external features is the purpose of this circular. A short account of the distribution, life history, and economic importance of each fish is included.

Statistical Report of Fresh and Canned Fishery Products (Year 1948, Sardine Season 1948-49), Circular No. 23, 17 p. of tables, printed. Bureau of Marine Fisheries, Division of Fish and Game, San Francisco, Calif. The tables in this report show the landings of all fish and shellfish by main fishing areas, including the amount of pilchards and tuna landed. Included is the production of canned, cured and manufactured fishery products, as well as meal and oil.

"The Territorial Waters of Newfoundland," by Raymond Gushue, article, Canadian Journal of Economics and Political Science, August 1949, vol. XV, no. 3, pp. 344-52. The Canadian Political Science Association, Toronto, Ontario. Mr. Raymond Gushue of the Newfoundland Fisheries Board discusses various aspects of the "territorial waters" problem as it affects Newfoundland.

World Fisheries Year-Book and Directory 1949 (Incorporating the North Atlantic Fisheries Year-Book and the Herring Exporters Manual), edited by Harry F. Tysser, 457 p., printed, illus., 1 pound sterling (approx. $2.80). British-Continental Trade Press Ltd., 222 Strand, London, England. The first part of the book consists of editorial articles on various subjects on the fisheries and fish-processing industries and trades, and a chapter "World Survey" which covers the fisheries of several of the more important countries. The second half of the book is a directory which lists names, addresses, and other particulars on firms in eight branches of the industry, grouped by countries. Includes exporters and curers, quick-freezers, trawler owners; importers and wholesalers; fish canners and preservers; machinery and equipment for fish processing, refrigeration, etc.; packing machinery, materials, etc.; supplies for fisheries--ship builders, repairers, nets, cordage, instruments and other equipment; fish byproducts (meal, oil, vitamins, etc.); cold storage and transport; and also gives a list of trade marks and names; buyers' guide and classified list of advertisers; and organizations and trade associations. The articles cover the following subject: International Commission on Fisheries; technical developments in fishing vessel construction; modern wireless for fishing vessels; the cooperative movement in the fishing industry; the control of bacteria in fish; the development of quick freezing in the fishing industry; processing of fish; problems of preserving fish for tropical countries; packing materials and shipping containers; land transport and air transport of fish; shellfish and crustaceans on the market; fish meal and oil production methods, fish oils; fish canning developments, and others.



Processing -- Miscellaneous Service Division

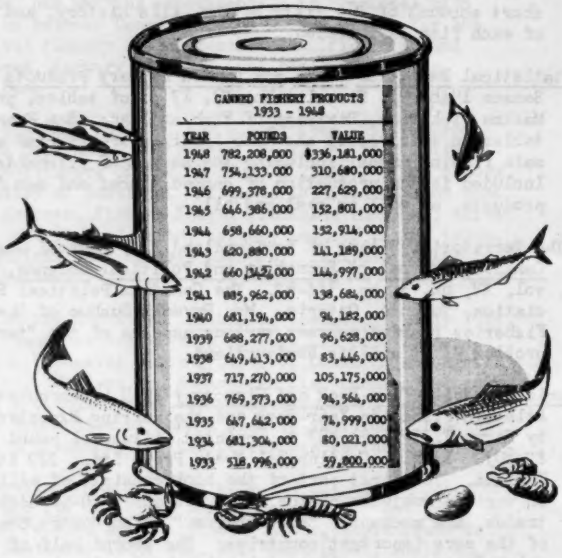
Illustrator -- Gustaf T. Sundstrom **Compositor -- Jean Zalevsky**

66193

CANNED FISH & BYPRODUCTS--1948

Annual survey data on the production of canned fishery products and byproducts for 1948 are contained in the report, Canned Fish & Byproducts--1948, C.F.S. 497.

This 18-page annual statistical summary contains data on the production of canned fishery products and byproducts, including value, can sizes, and trade classifications. Gives the pack of and number of plants producing canned fish and shellfish by species, and production of fishery byproducts by commodity; imports of canned fishery products, fish oil, scrap and meal; and historical data for 1921 through 1948.



Canned fishery products and byproducts, valued at $416,045,802, were produced in the United States and Alaska during 1948--an increase of 6 percent compared with the previous year, and 235 percent above the average yearly value for the period from 1935 to 1939, inclusive.

Copies of this bulletin, C.F.S. 497, are available free upon request from the Division of Information, U. S. Fish and Wildlife Service, Washington 25, D. C.

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILD LIFE SERVICE
WASHINGTON 25, D. C.

OFFICIAL BUSINESS
Permit No. 1015
Form FWSa - 11/49 - 3,050

PENALTY FOR PRIVATE USE TO AVOID
PAYMENT OF POSTAGE, $300

University of Michigan General Library,
Ann Arbor,
Michigan.